AXIS™ 42KC, 45UC, 45XC, 35BF Access Floor Terminal Units

Installation, Operation and Configuration Instructions

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SAFETY CONSIDERATIONS

SAFETY NOTE

Air-handling equipment will provide safe and reliable service when operated within design specifications. The equipment should be operated and serviced only by authorized personnel who have a thorough knowledge of system operation, safety devices and emergency procedures.

Good judgement should be used in applying any manufacturer's instructions to avoid injury to personnel or damage to equipment and property.

⚠ WARNING

Disconnect all power to the unit before performing maintenance or service. Unit may automatically start if power is not disconnected. Electrical shock and personal injury could result.

⚠ WARNING

If it is necessary to remove and dispose of mercury contactors in electric heat section, follow all local, state, and federal laws regarding disposal of equipment containing hazardous materials.

GENERAL

The 45XC fan-powered mixing box provides plenum pressure and temperature control to the underfloor plenum. The 45XC mixing box is also equipped with a modulating primary air damper and a variable speed fan. Together, these features allow the 45XC unit to maintain plenum pressure at the desired pressure set point while adjusting the plenum temperature to match the load requirements.

The 45UC series underfloor fan-powered terminal and the 42KC fan coil unit are used to provide increased cooling or supplemental heating to perimeter zones. These units are available with factory-installed electric or hot water heating coils.

The controllers are factory-mounted. The 33ZCPLNCTL zone controller is supplied on the 45XC fan-powered mixing box. The 33ZCFANTRM underfloor controller is supplied on the 45UC underfloor fan-powered terminal. The 42KC fan coil units contain the 33ZCFANCOL perimeter fan coil controller. All are designed to be an integral part of the Carrier Direct Digital Controls (DDC) system. The controllers can communicate on the Carrier Comfort Network® (CCN) system while completely integrating with the building's heating, ventilation and air conditioning (HVAC) system.

System Overview — Electronic control units feature a factory-installed enclosure that provides easy access for field connections.

The 45XC zone controller is factory-supplied and factory-configured, and consists of a processor, pressure transducer and actuator. The controllers are configured to maintain the plenum pressure between 0.01 and 1.0 in. wg and to control and maintain space temperature by measuring both plenum and space temperature. The space temperature set point may be adjusted by the user through the space temperature sensor without additional software.

Each 45XC zone controller also has the ability to function as a linkage coordinator for systems with up to 128 zones. As a linkage coordinator, a controller retrieves and provides system information to the air-handling equipment and other zone controllers. When a primary supply air sensor is installed, the controller can function as a stand-alone device. See Fig. 1 and 2.

The controller monitors differential pressure from two pressure probes: one mounted in the space and one in the pressurized plenum. It compares the resulting signal to a plenum pressure set point in order to provide pressure-independent control of the air passing through the mixing box into the plenum.

The controller is wired to a wall-mounted, field-supplied, space temperature sensor (SPT) in order to monitor zone temperature changes and satisfy zone demand.

The controller is designed to allow a service person or building owner to configure and operate the unit through the CCN user interface, however, a user interface is not required for day-to-day operation. All maintenance, configuration, setup, and diagnostic information is available through the Level II communications port to allow data access by an attached computer running Network Service Tool, ComfortVIEW™, or ComfortWORKS® software.

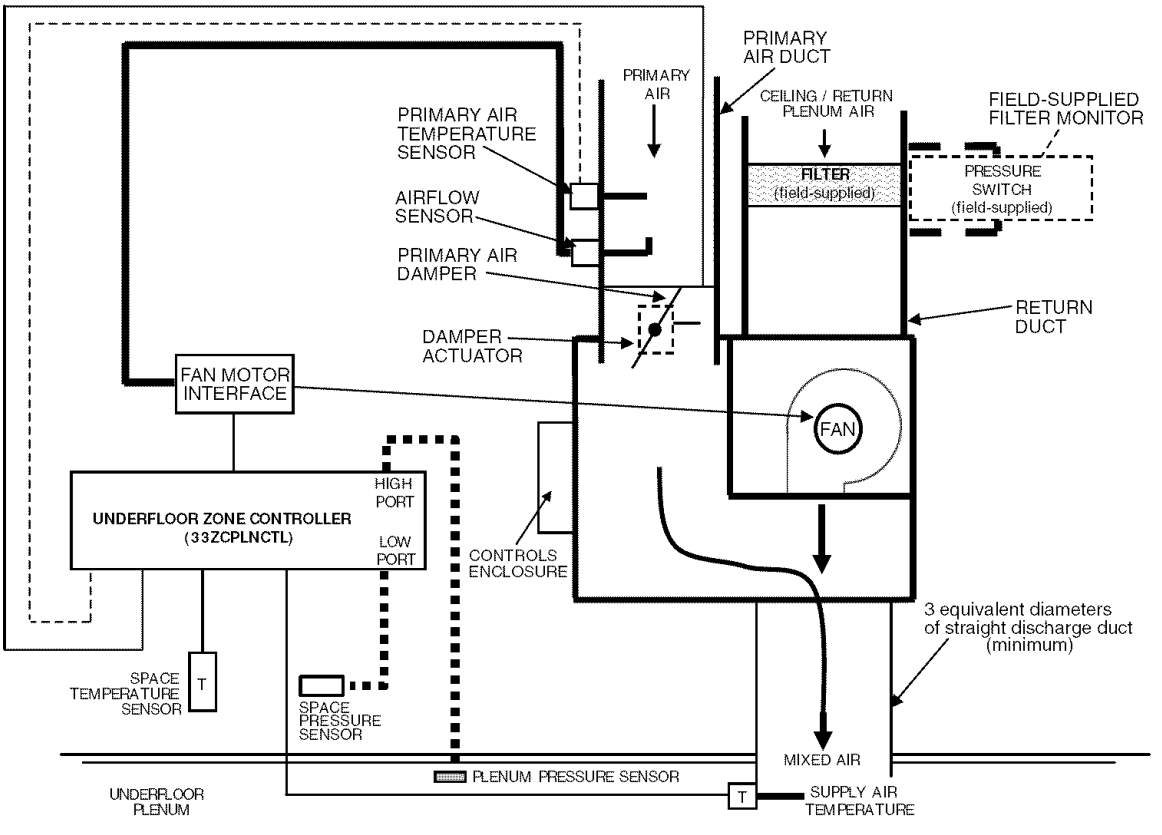


Fig. 1 — Typical Installation of Single 45XC Fan-Powered Mixing Unit for Each Underfloor Zone

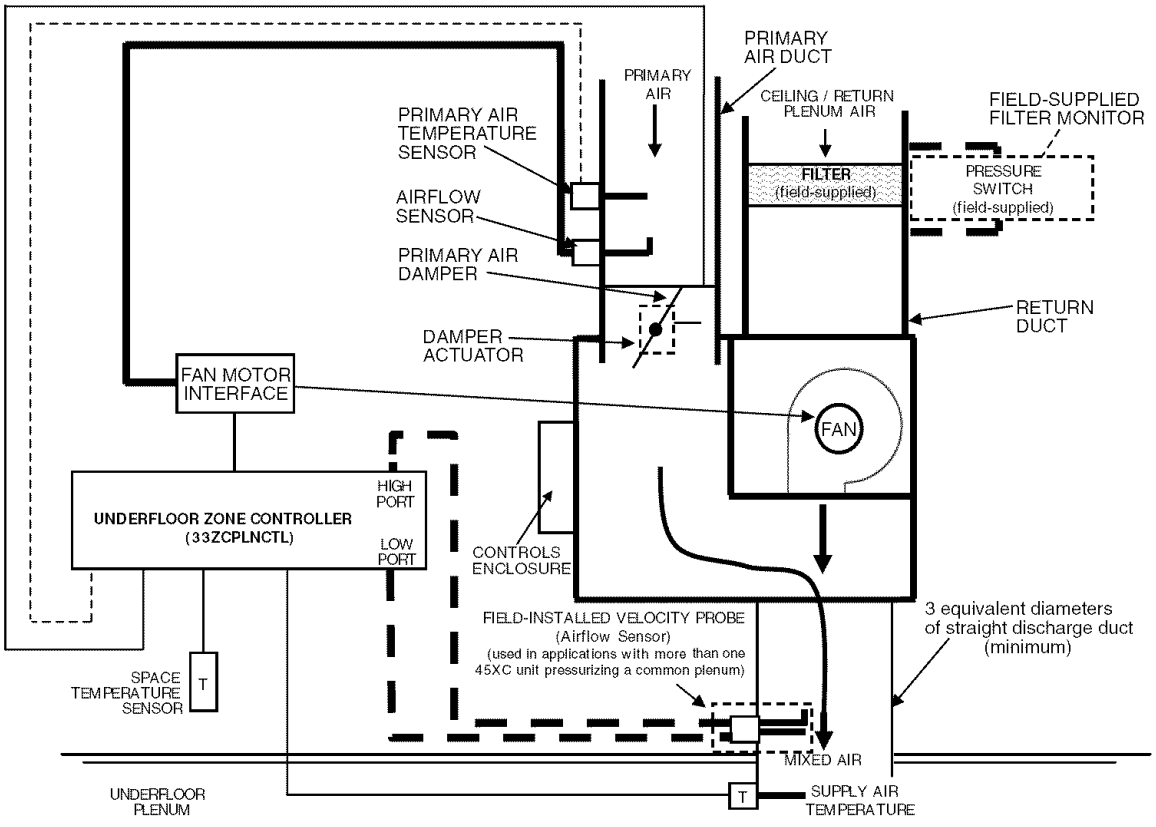


Fig. 2 — Typical Installation for Multiple 45XC Fan-Powered Mixing Units in a Larger Common Underfloor Zone (One 45XC Unit Shown)

System Architecture — Figure 3 shows the typical control system architecture: a 45XC mixing box unit used to provide the main plenum pressure and temperature control and four 42KC fan coil units to provide supplemental heating and cooling.

Figure 4 shows an arrangement of underfloor and zone controllers and terminal units employed in the HVAC system of a large building. Though all controllers are connected to the same bus, controllers are configured to stand alone, satisfying the needs of individual zones. These are commonly used in perimeter zones. All underfloor controllers participate in linkage, with one configured as a linkage master; the rest are configured as slaves.

This arrangement, from the software point of view, gives the following information:

- All controllers may be configured to stand alone with their own sensor OR they may share a temperature sensor between themselves. The zone controllers do not share sensor data with underfloor controllers.
- Controllers may have their own temperature sensor (located near ceiling plenum) OR may share a single temperature sensor.
- Controllers participate in linkage when sending the damper position, occupancy, zone temperature and temperature set point data to the master underfloor controller.

A bridge is recommended to isolate the underfloor control system from the primary communication (comm) bus to:

- improve communication quality
- increase communication speed

Controllers use the underfloor plenum as the air source and control the diffusers to satisfy the space temperature needs. Controllers also make use of strip heaters for auxiliary heating.

POWER REQUIREMENTS — The power supply is 24 vac ± 10% at 40 va (50/60 Hz).

WIRING CONNECTIONS — Field wiring is 18-gage to 22-gage wire. The zone controller is a NEC (National Electrical Code) Class 2 rated device.

INPUTS

- space temperature sensor
- primary air damper position
- plenum sensor (factory-installed)
- supply air temperature sensor
- optional primary air temperature sensor (required for systems which do not utilize a linkage compatible air source)
- optional CO_2 sensor
- optional relative humidity sensor

OUTPUTS

- internally factory-wired VAV (variable air volume) actuator
- internally factory-wired fan speed controller

ACCURACY — Terminal airflow pressure control is rated to 1 in. wg measured maximum pressure. The zone controller is capable of controlling from as low as 0.01 in. wg to as high as 1.0 in. wg nominal pressure with an accuracy of ± 3% (nominal) at any point within the range.

HARDWARE (MEMORY) — The hardware consists of FLASH EPROM memory.

DIFFERENTIAL PRESSURE SENSOR — Pressure range is 0.0 to 2.0 in. wg maximum for the onboard pressure sensor.

SPECIFIED SENSING TEMPERATURE RANGE — The controller space temperature measuring range is –40 to 245 F. This range applies to space temperature, supply-air temperature and primary air temperature sensors. The controller has an allowable control set point range from 40 to 90 F for heating and 45 to 99 F for cooling.

COMMUNICATIONS — The maximum number of controllers is limited to 128 zones, with a limit of 8 systems (Linkage Coordinator configured for at least 2 zones). Carrier Comfort Network® (CCN) bus length may not exceed 4000 ft, with no more than 60 devices on any 1000 ft section. Optically isolated RS-485 repeaters are required every 1000 ft.

At 19,200 and 38,400 baud, the number of controllers is limited to 128 maximum, with no limit on the number of Linkage Coordinators. Bus length may not exceed 1000 ft.

ENVIRONMENTAL RATINGS — Operating Temperature is 32 to 140 F at 0 to 90% rh (relative humidity) (non-condensing).

Shipping Temperature is –40 to 185 F at 0 to 90% rh (non-condensing).

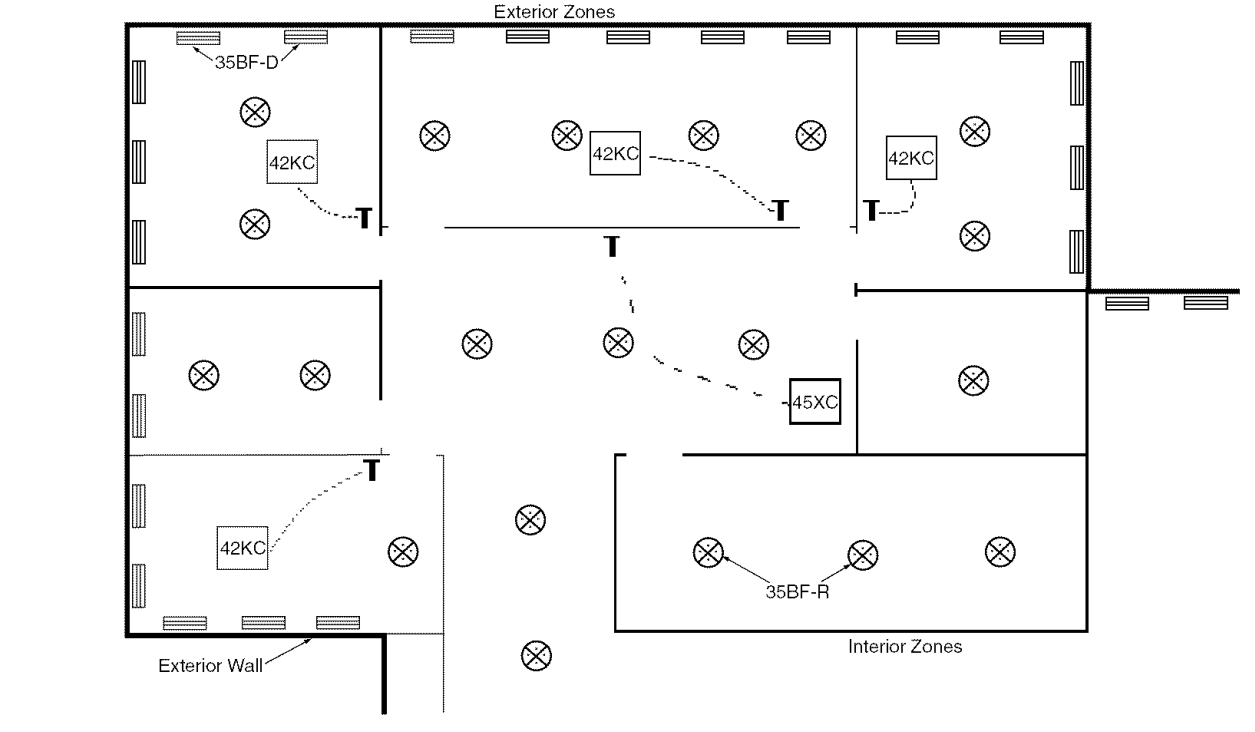
PERFORMANCE VIBRATION

- 0.014 in. peak-to-peak displacement measured at 5 to 31 Hz
- 0.75 G measured at 31 to 300 Hz

CORROSION — Equipment intended for indoor use only.

APPROVALS

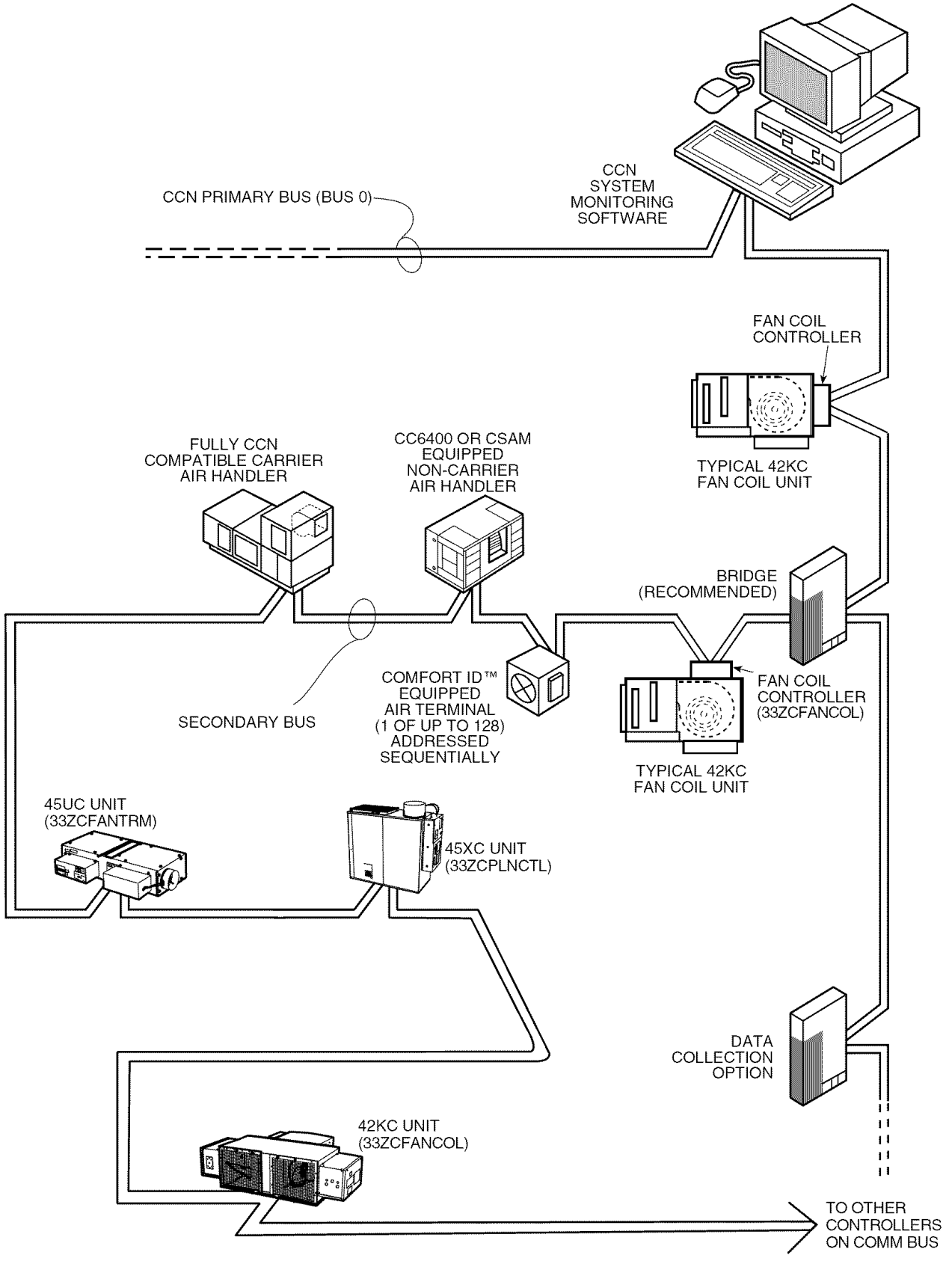
- listed under UL 873
- conforms to requirements per European Consortium standards EN50081-1 (CISPR 22, Class B) and EN50082-1 (IEC 801-2, IEC 801-3, and IEC 801-4) for CE mark labeling
- UL94-5V plenum rated (housing and actuator)



LEGEND

42KC — Perimeter Fan Coil Unit with 33ZCFANCOL Fan Coil Controller
45XC — Fan-Powered Zone Mixing Unit with 33ZCPLNCTL Zone Controller
T — Wall-Mounted Temperature Sensor
35BF-D Linear Diffuser
35BF-R Swirl Diffuser

Fig. 3 — Typical System Layout (45XC and 42KC)



LEGEND

CCN — Carrier Comfort Network®
CSAM — Comfort System *Air*Manager™

Fig. 4 — Control System Architecture with Underfloor Terminal Units

PRE-INSTALLATION

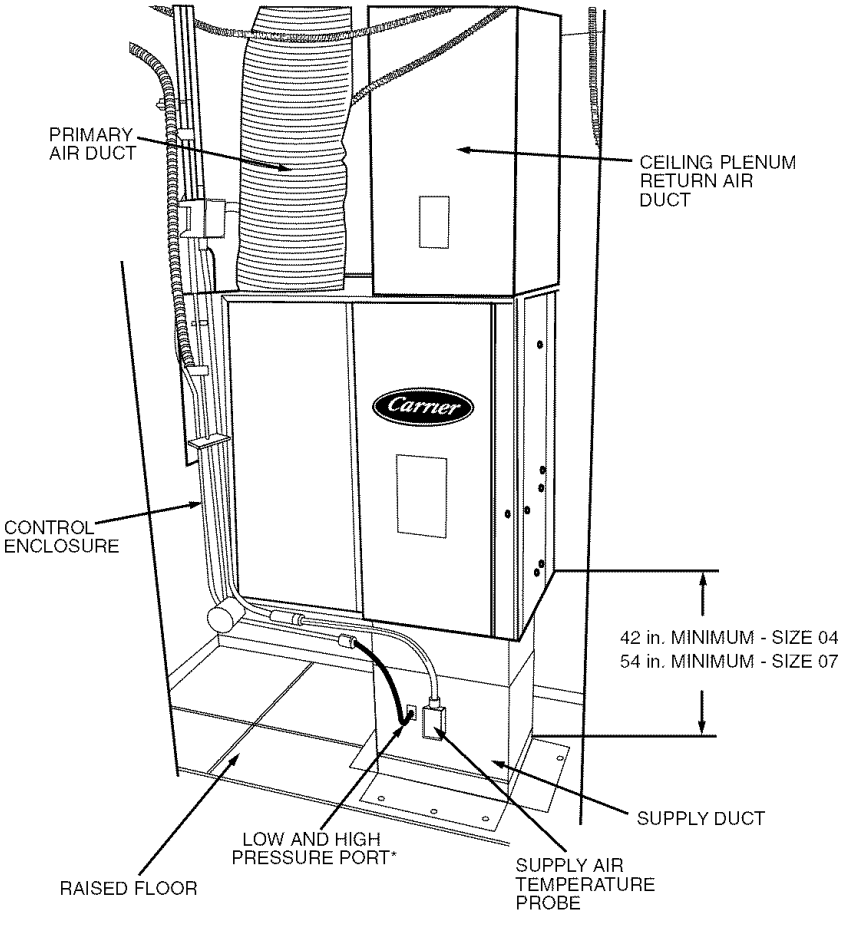
Unpack and Inspect Units — Remove shipping wraps from all units. Check the shipment against shipping order. Inspect for damage upon receipt. *If shipment is damaged or incomplete, file claim with transportation company and advise Carrier immediately.*

Storage and Handling — Store in a clean, dry and covered location. Do not stack units. When unpacking units, care should be taken that the inlet collars and externally mounted components do not become damaged. Do not lift units using collars, sensors, or externally mounted components as handles. If a unit is supplied with electric or hot water heat, care should be taken to prevent damage to these devices. Do not lay uncrated units on end or sides. Do not stack uncrated units over 6 ft high. Do not handle control boxes by tubing connections or other external attachments.

Prepare Jobsite for Unit Installation — To save time and to reduce the possibility of costly errors, set up a complete sample installation in a typical room at the jobsite. Check all critical dimensions. Refer to job drawings and product dimension drawings as required.

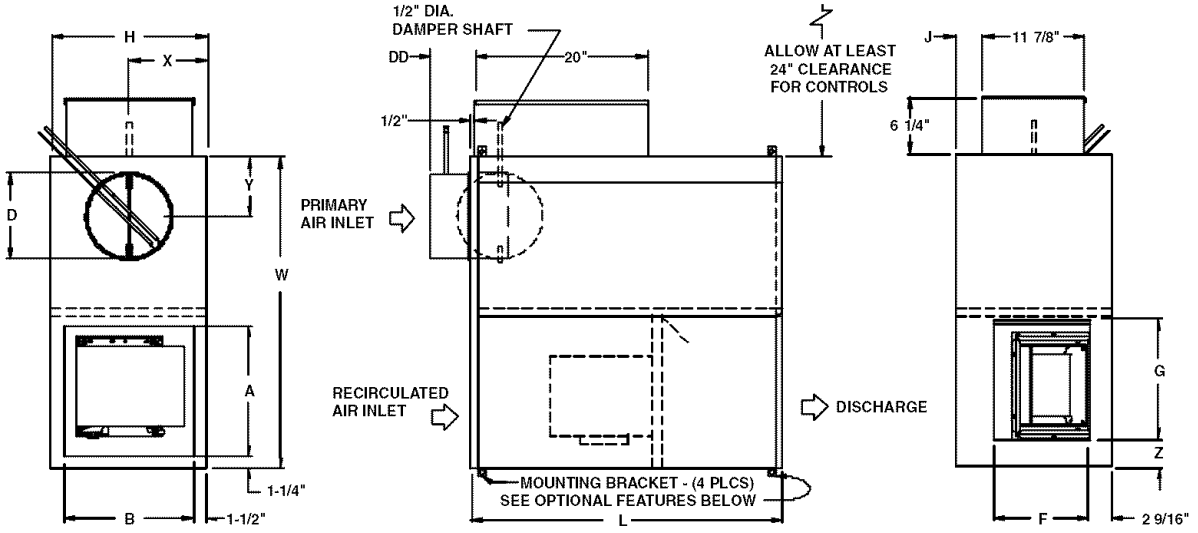
45XC FAN-POWERED ZONE MIXING UNIT INSTALLATION

Physical components of the 45XC fan-powered zone mixing unit is detailed in Fig. 5. Figure 6 shows 45XC fan-powered zone mixing unit dimensions and weight data.



*Installation is shown for a single unit in a multiple unit/common plenum application. High and low pressure ports piped to a discharge plenum. Refer to Fig. 2.

Fig. 5 — 45XC Fan-Powered Zone Mixing Unit Physical Details



INLET VIEW | **PLAN VIEW – LEFT HAND UNIT** (RIGHT HAND UNITS AVAILABLE - CONTROLS NOT SHOWN) | **DISCHARGE VIEW**

45XC UNIT SIZE	UNIT WEIGHT (lb)	FILTER SIZE (in.)	FILTER P/N	FILTER KIT P/N
4	209	17 x 17 x 1	102649-1717	3503341717
7	269	22 x 19 x 1	102649-2219	3503342219

UNIT SIZE	INLET SIZE (in.)	PRI. CFM	FAN CFM*	MAX FLOW	HP	DIMENSIONS (in.)											
						L	W	H	Recirc. Air		D	Discharge		X	Y	Z	J
									A	B		F	G				
4	6	500	1200	1700	1/2	36 1/8	36 1/8	18 1/16	15 1/8	15	5 7/8	11	14	9	6	3 1/8	3 1/8
	8	900	1200	2100	1/2	36 1/8	36 1/8	18 1/16	15 1/8	15	7 7/8	11	14	9	6	3 1/8	3 1/8
	10	1400	1200	2600	1/2	36 1/8	36 1/8	18 1/16	15 1/8	15	9 7/8	11	14	9	7	3 1/8	3 1/8
	12	2100	1200	3300	1/2	36 1/8	36 1/8	18 1/16	15 1/8	15	11 7/8	11	14	9	8	3 1/8	3 1/8
7	10	1400	2500	3900	1	42 1/8	46 1/8	20 1/16	20 1/8	17	9 7/8	15	17	10	7	5 1/2	4 1/8
	12	2100	2500	4600	1	42 1/8	46 1/8	20 1/16	20 1/8	17	11 7/8	15	17	10	8	5 1/2	4 1/8
	14	2800	2500	5300	1	42 1/8	46 1/8	20 1/16	20 1/8	17	13 7/8	15	17	10	10	5 1/2	4 1/8
	16	3700	2500	6200	1	42 1/8	46 1/8	20 1/16	20 1/8	17	15 7/8	15	17	10	10 1/4	5 1/2	4 1/8

*Estimated for rpm/torque controlled motor, at 0.1 in. wg static pressure under floor.
NOTE: Inlet Size: 6-10, DD = 3 7/8 in. Inlet Size: 12-16, DD = 5 7/8 in.

Fig. 6 — 45XC Fan Powered Zone Mixing Unit Physical Data and Dimensions

45XC Hardware — The 45XC fan-powered mixing unit contains the 33ZCPLNCTL zone controller.

Figure 7 shows the zone controller physical details.

45XC Field-Supplied Hardware — Each 45XC fan-powered zone mixing unit requires the following field-supplied components to complete its installation:

- transformer — 24 vac, 40 va (standard applications)
- contactors (as required for electric heat)
- 1/4-in. OD flame retardant polyethylene tubing (length not to exceed 25 ft)
- space temperature sensor (33ZCT55SPT, 33ZCT56SPT, or 33ZCT57SPT)
- supply-air temperature sensor (33ZCSENSAT) with two no. 10 x 1/2-in. sheet metal screws (to secure SAT sensor to supply duct)
- primary-air temperature sensor
- indoor-air quality (CO_2) sensor (optional)
- relative humidity sensor (optional)

SPACE TEMPERATURE SENSOR (Fig. 8) — Each 33ZCPLNCTL zone controller requires a field-supplied Carrier space temperature sensor. There are three sensors available for this application:

- 33ZCT55SPT, space temperature sensor with override button
- 33ZCT56SPT, space temperature sensor with override button and set point adjustment
- 33ZCT57SPT, space temperature sensor with override button, set point adjustment, and manual fan speed control

SUPPLY-AIR TEMPERATURE (SAT) SENSOR (Fig. 9) — The zone controller must be connected to a field-supplied supply air temperature (SAT) sensor (P/N 33ZCSENSAT) to monitor the temperature of the air delivered by the fan coil.

PRIMARY-AIR TEMPERATURE SENSOR (PAT) (Optional) — A field-supplied, primary air temperature (PAT) sensor (P/N 33ZCSENPAT) is used on a zone controller that is functioning as a linkage master for a non CCN/linkage compatible air source. See Fig. 10.

INDOOR-AIR QUALITY (CO_2) SENSOR (Fig. 11) — An indoor air quality sensor is required for IAQ monitoring. Three different CO_2 sensors are available for zone CO_2 level monitoring.

- The 33ZCSENCO2 sensor is an indoor, wall-mounted sensor with an LED (light-emitting diode) display.
- The 33ZCT55CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button.
- The 33ZCT56CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button and temperature offset.

RELATIVE HUMIDITY SENSOR (Fig. 12) — The relative humidity sensor (P/N 33AMSENRHS000) is an indoor, wall-mounted sensor and is required for zone humidity control (dehumidification).

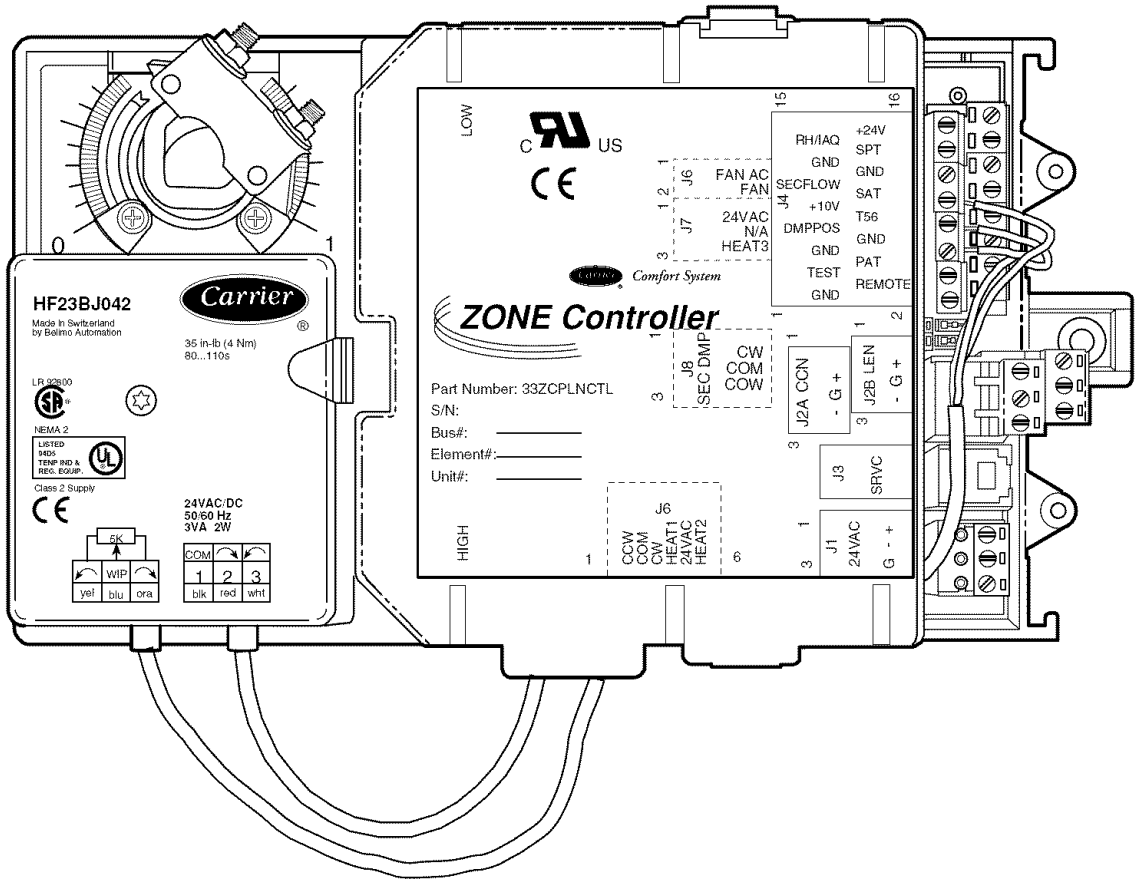


Fig. 7 — 45XC Fan-Powered Zone Mixing Unit Controller Physical Details (33ZCPLNTCTL)

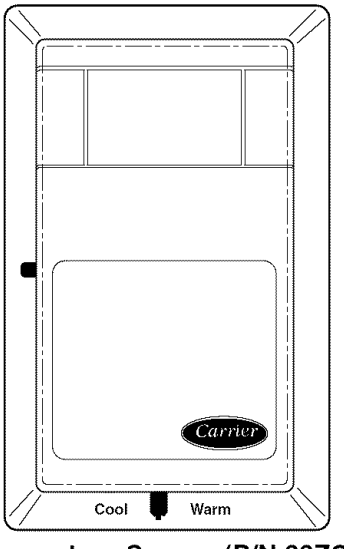
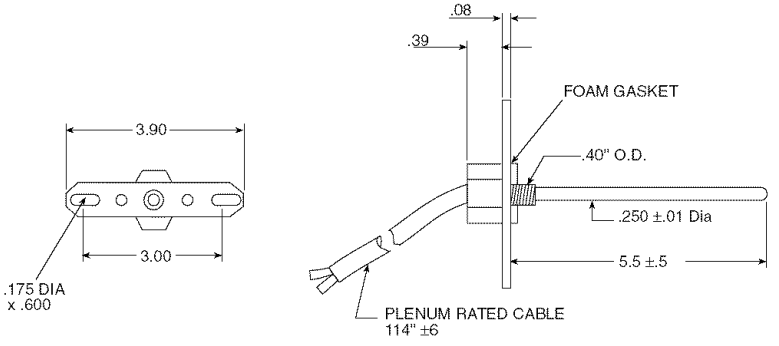


Fig. 8 — Space Temperature Sensor (P/N 33ZCT56SPT Shown)



NOTE: Dimensions are in inches.

Fig. 9 — Supply Air Temperature Sensor (33ZCSENSAT)

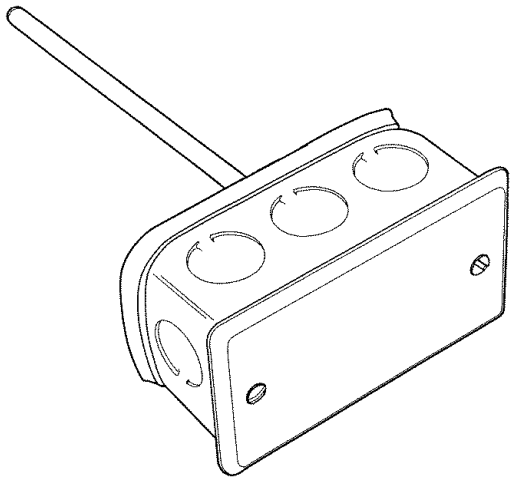
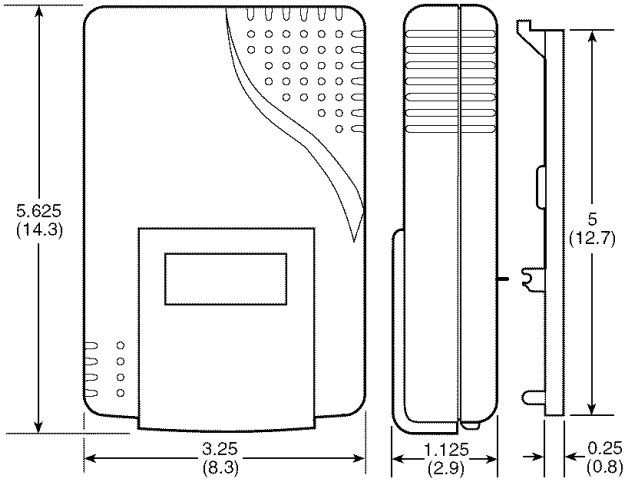


Fig. 10 — Primary Air Temperature Sensor (33ZCSENPAT)



NOTE: Dimensions are in inches. Dimensions in ( ) are in centimeters.

Fig. 11 — Indoor Air Quality (CO_2) Sensor (33ZCSENCO2)

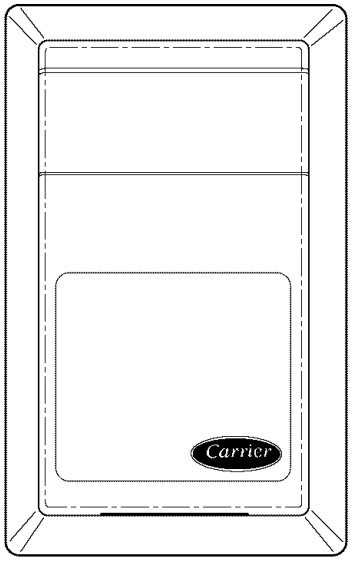


Fig. 12 — Wall-Mounted Relative Humidity Sensor (33AMSENRHS000)

45XC Fan-Powered Zone Mixing Box Installation

STEP 1 — SELECT LOCATION

1. Units should be installed so that they do not come in contact with obstacles such as rigid conduit, sprinkler piping, Greenfield flexible metal covering, or rigid pneumatic tubing; such contact can transmit vibration to the building structure, causing objectionable low frequency noise.
2. Units should never be installed tightly against concrete slabs or columns, as vibration transmission is amplified in this condition.
3. Fan-powered terminals require sufficient clearance for servicing the blower/motor assembly from the bottom of the unit, low voltage controls from the side and line voltage motor controls or electric heat (if equipped) from the rear (discharge end) of the unit. See Fig. 6.

   Bottom access panel removal requires a minimum of 3-in. minimum clearance, in addition to substantial horizontal clearance, to slide the access panel out of the way for service. Actual horizontal dimensions will vary due to varying access panels for different sized units. See unit submittal drawings for detailed information.

   NOTE: Be certain that accommodations for panel removal of unit casings are large enough to allow adequate internal service room once the panels are removed.

   A clearance of 18 in. is recommended for control enclosure access. Unit control enclosure will vary depending on which control package is used. Control enclosure location is specified on unit submittals. Low voltage enclosure covers are removable, not hinged.

   A clearance of 36 in. is recommended for line voltage motor controls and electric heat control access. High voltage motor controls or electric heat control access is supplied with hinged access doors for units with fused disconnect. Specific location is indicated on the unit submittal.

   These recommendations do not supersede NEC (National Electrical Code) or local codes that may be applicable. Adherence to these codes are the responsibility of the installing contractor.
4. Whenever possible, fan-powered boxes should be installed over halls or passageways (rather than over occupied spaces) in order to limit the sound reaching occupants.

STEP 2 — POSITION UNIT

1. When moving boxes, use appropriate material handling equipment and avoid contact with shaft extensions, controls, wiring, piping, heaters, and control boxes.
2. Raise unit to position using safe mechanical equipment and support until hanging means are attached and box is level.

STEP 3 — INSTALL UNIT

1. Install field-supplied eyebolts, straphangers or bolt rod supports as desired. Figure 13 illustrates possible 45XC unit suspension methods. A typical underfloor installation is shown in Fig. 14.
2. Care should be taken to use hanging materials of sufficient stiffness and strength, rigidly attached to the unit. Straps should not be located on coil flanges, electric heat sections, or control boxes. When using trapeze supports, avoid areas where access is required to side mounted controls, or side or bottom access doors. For best installation with trapeze supports, provide elastomeric material between unit and supports.
3. Hangers should be securely attached to bar joist or mounting anchors properly secured to building structure with lugs or poured-in-place hangers. Percussion nails are not considered adequate anchors.

STEP 4 — MAKE DUCT CONNECTIONS

1. Check that the pressure pick-up in primary air collar is located properly and that air supply duct connections are airtight. Install supply ductwork on unit inlet collar, following all accepted medium-pressure duct installation procedures. Seal joints against leakage.

   NOTE: For maximum efficiency in controlling radiated noise in critical applications, inlet ducts should be fabricated of 24-gage minimum sheet metal in place of flex connections. Flex duct is extremely transparent to radiated sound; consequently high inlet static pressure (Ps) or sharp bends with excessive pressure drop can cause a radiated noise problem in the space. If flex duct is used, it should be limited to the connection between the distribution duct and the boot diffuser.
2. Install the discharge duct, being careful not to reduce the face area of any electric heat section until several diameters away from the unit. It is strongly recommended that lined discharge duct be used downstream of the unit. Insulate duct as required.
3. Fan boxes should not be attached to octopus sections immediately downstream of the unit.
4. Install optional return-air filters before operating the unit.
5. Leave construction filters supplied with the box in place until installation is complete and building is cleared for occupancy.

STEP 5 — POWER WIRING

⚠ WARNING

Disconnect electrical power before wiring or servicing the unit. All disconnect switches on the terminal (if equipped) should be in the OFF position while making power connections. Electrical shock, personal injury, or damage to the zone controller can result.

1. All power wiring must comply with local codes and with NEC ANSI/NFPA (American National Standards Institute/National Fire Protection Association) 70-1981. Disconnect switches are optional equipment. Electrical, control and piping diagrams are shown on the exterior labeling or on a diagram inside the control and high-voltage enclosure covers, unless otherwise specified in the order write-up. All units are wired for a single point electrical connection to the fan and electric heater (if equipped). Electric heaters provided by Carrier are balanced by kW per stage. The installing electrician should rotate incoming electric service by phase to help balance overall building load.
2. All field wiring must be provided with a safety disconnect per NEC 424-19, 20, and 21.
3. Units with electric heat should use copper wires rated at least 125% of rating plate amperage. Refer to the unit's rating label and minimum supply circuit amps.
4. Observe wiring diagram and instructions attached to the unit. A Wye power source with a fourth (neutral) wire in addition to the full sized ground wire is required for 480-v, 3-phase units. All units must be grounded as required by NEC 424-14 and 250. See Fig. 15A and 15B.

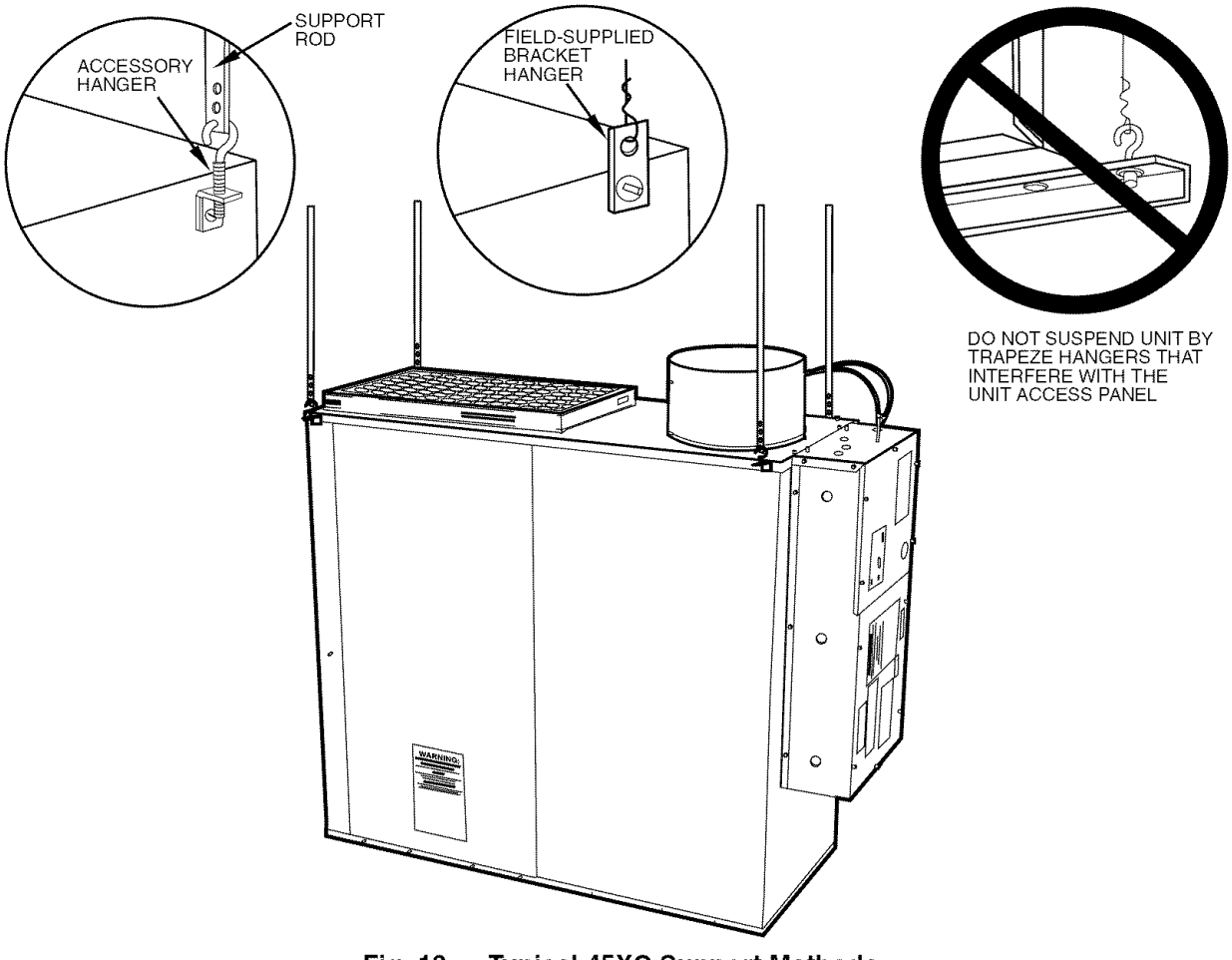

SUPPORT ROD
ACCESSORY HANGER
FIELD-SUPPLIED BRACKET HANGER
DO NOT SUSPEND UNIT BY TRAPEZE HANGERS THAT INTERFERE WITH THE UNIT ACCESS PANEL

Fig. 13 — Typical 45XC Support Methods

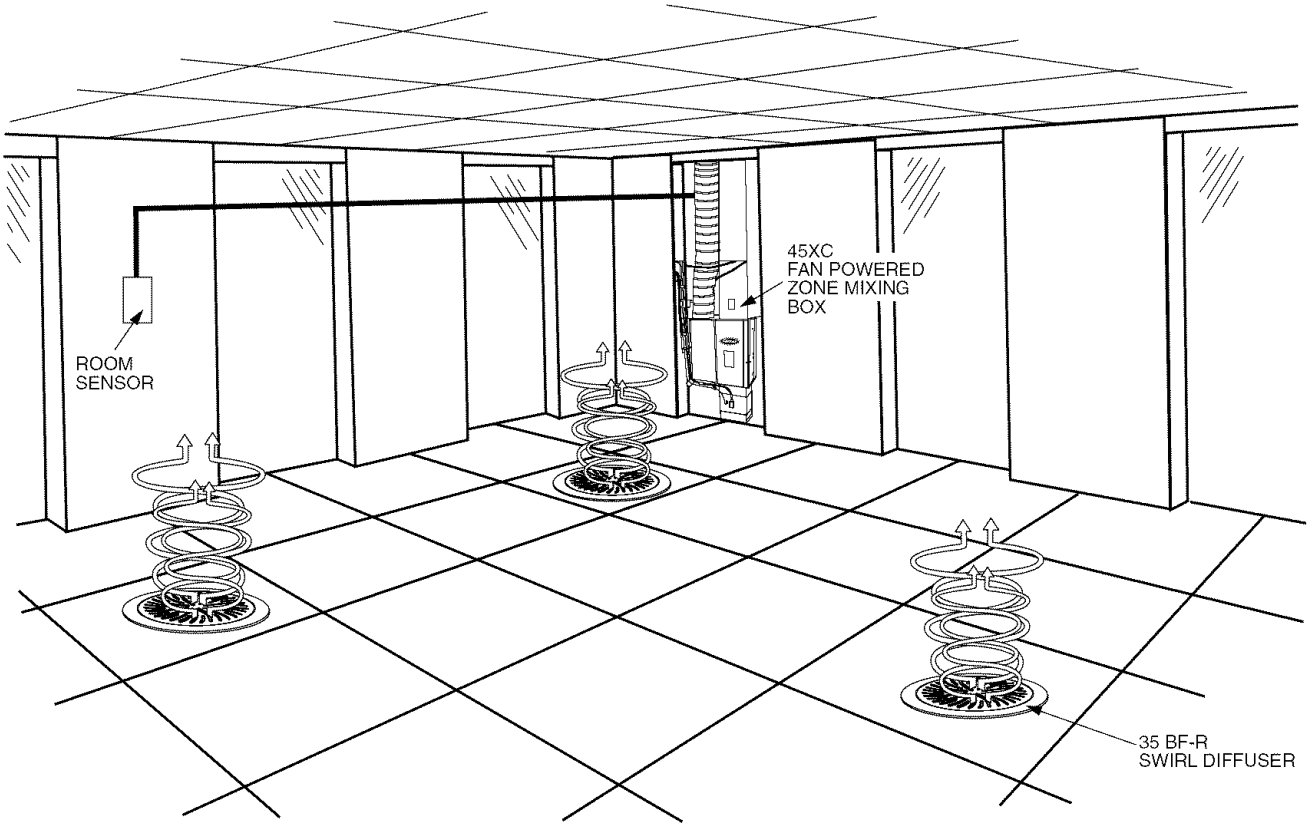
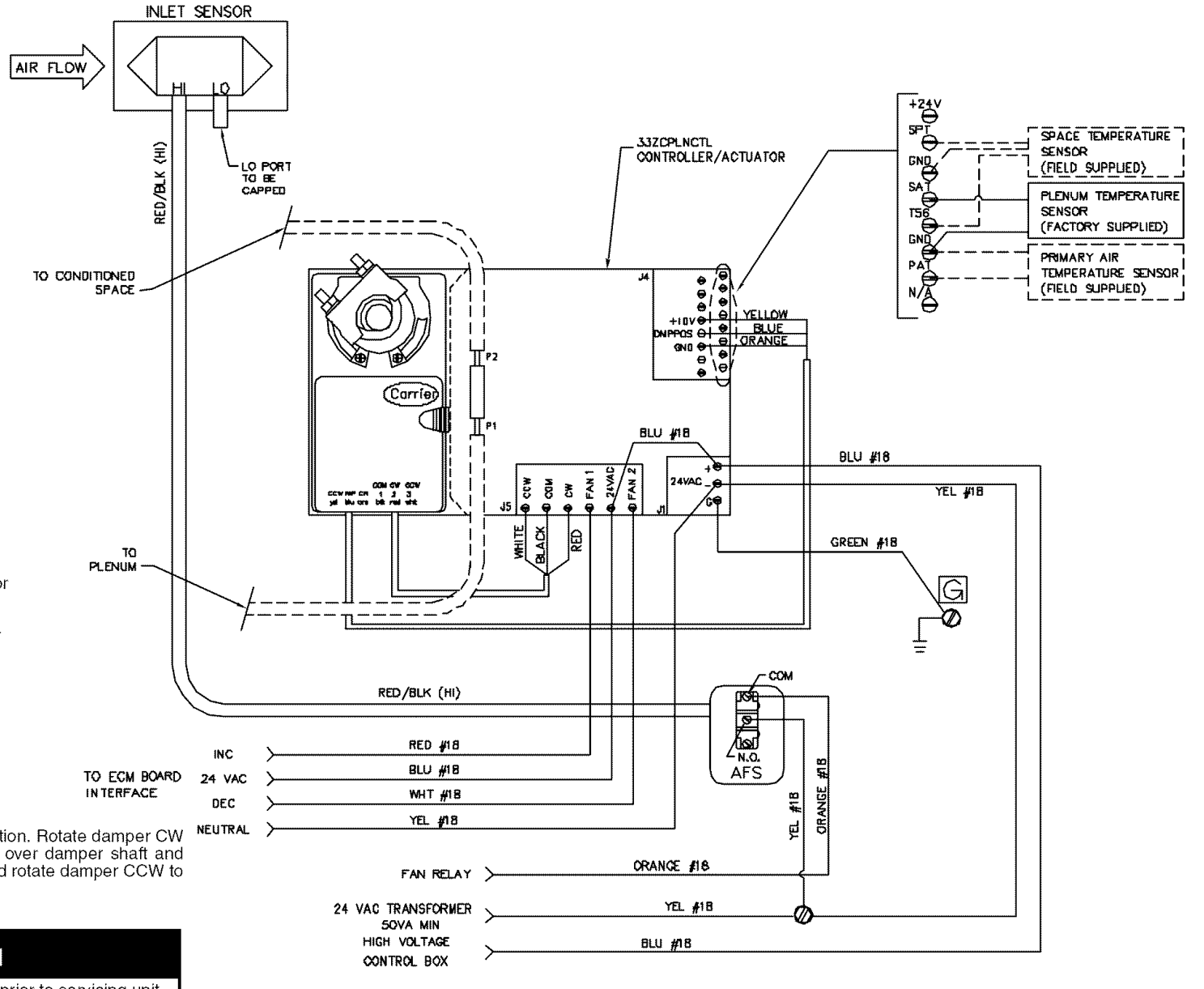


Fig. 14 — Typical Underfloor Installation — 45XC Fan-Powered Mixing Box



LEGEND

AFS	—	Airflow Switch
COM	—	Common
CCW	—	Counterclockwise
CW	—	Clockwise
DMPPOS	—	Damper Position
ECM	—	Electronically Commutated Motor
GND	—	Ground
N.O.	—	Normally Open
PAT	—	Primary Air Temperature Sensor
SAT	—	Plenum Temperature Sensor
SPT	—	Space Temperature Sensor
UL	—	Underwriter's Laboratories
		Factory Piping
		Factory Wiring
		Field Wiring

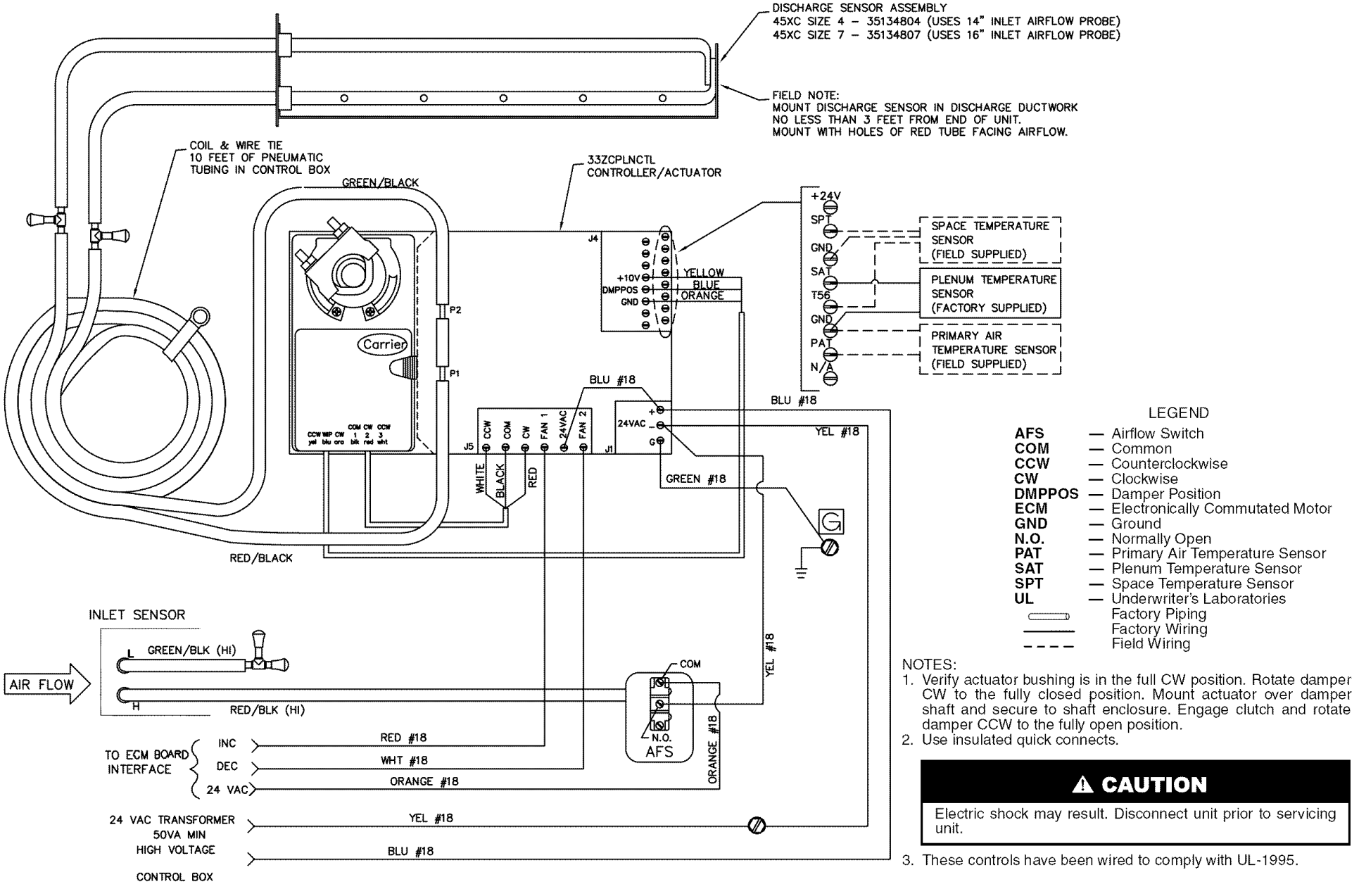
NOTES:
1. Verify actuator bushing is in the full CW position. Rotate damper CW to the fully closed position. Mount actuator over damper shaft and secure to shaft enclosure. Engage clutch and rotate damper CCW to the fully open position.
2. Use insulated quick connects.

⚠ CAUTION

Electric shock may result. Disconnect unit prior to servicing unit.

3. These controls have been wired to comply with UL-1995.

Fig. 15A — 45XC Zone Controller Wiring — Control Package 4840



LEGEND

AFS	—	Airflow Switch
COM	—	Common
CCW	—	Counterclockwise
CW	—	Clockwise
DMPPOS	—	Damper Position
ECM	—	Electronically Commutated Motor
GND	—	Ground
N.O.	—	Normally Open
PAT	—	Primary Air Temperature Sensor
SAT	—	Plenum Temperature Sensor
SPT	—	Space Temperature Sensor
UL	—	Underwriter's Laboratories
		Factory Piping
		Factory Wiring
		Field Wiring

NOTES:
1. Verify actuator bushing is in the full CW position. Rotate damper CW to the fully closed position. Mount actuator over damper shaft and secure to shaft enclosure. Engage clutch and rotate damper CCW to the fully open position.
2. Use insulated quick connects.

⚠ CAUTION

Electric shock may result. Disconnect unit prior to servicing unit.

3. These controls have been wired to comply with UL-1995.

Fig. 15B — 45XC Zone Controller Wiring — Control Package 4841

45XC Sensor Installation

GENERAL SENSOR INSTALLATION — The sensor should be mounted:

- on an internal wall near a return air grille or duct
- at least 3 ft from any corner, 2 ft from an open doorway and 4 to 6 ft from the floor
- proximal to the wiring egress on the wall
- where temperature operating limits are 32 to 122 F

The sensor should **NOT** be mounted:

- close to a window, on an outside wall, or next to a door leading to the outside
- close to or in direct airflow of areas such as open windows, drafts or over heat sources
- in areas with poor air circulation, such as behind a door or in an alcove where there are dramatic temperature fluctuations or moisture accumulation
- where it is influenced by supply air as the sensor will give an inaccurate reading
- where it may be exposed to direct occupant breathing, such as near water coolers or coffee machines.

SPACE TEMPERATURE SENSOR INSTALLATION — A space temperature sensor must be installed for each zone controller. There are three types of SPT sensors available used with the 33ZCPLNCTL controller: 33ZCT55SPT space temperature sensor with timed override button, 33ZCT56SPT space temperature sensor with timed override button and set point adjustment, and 33ZCT57SPT space temperature sensor with timed override button, set point adjustment, and manual fan speed control. See Fig. 8 and 16.

The space temperature sensor is used to measure the building interior temperature and should be located on an interior building wall. The sensor wall plate accommodates the NEMA (National Electrical Manufacturers Association) standard 2 x 4 in. junction box. The sensor can be mounted directly on the wall surface if acceptable by local codes.

Do not mount the sensor in drafty locations such as near air conditioning or heating ducts, over heat sources such as baseboard heaters or radiators, or directly above wall-mounted lighting dimmers. Do not mount the sensor near a window which may be opened, near a wall corner, or a door. Sensors mounted in these areas will have inaccurate and erratic sensor readings.

The sensor should be mounted approximately 5 ft from the floor, in an area representing the average temperature in the space. Allow at least 4 ft between the sensor and any corner and mount the sensor at least 2 ft from an open doorway.

The sensor consists of the following hardware:

1 — sensor top
1 — sensor base
1 — mounting plate
2 — machine screws (6 x 32)
2 — locking screws

⚠ WARNING

Before performing service or maintenance operations on the system, turn off main power switches to the unit. Electric shock can cause personal injury.

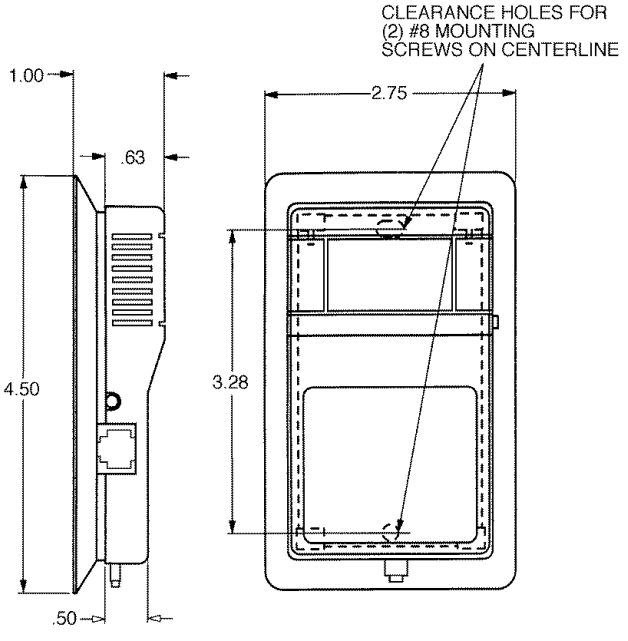
Install the sensor as follows (see Fig. 16):

1. Locate the two Allen type screws at the bottom of the sensor.
2. Turn the two screws clockwise to release the cover from the sensor wall mounting plate.
3. Lift the cover from the bottom and then release it from the top fasteners.
4. Feed the wires from the electrical box through the opening in the center of the sensor mounting plate.
5. Using two no. 6-32 x 1 machine screws (provided with the sensor), secure the sensor to the electrical box.

   NOTE: Sensor may also be mounted directly on the wall using 2 plastic anchors and 2 sheet metal screws (field-supplied).
6. Use 20-gage wire to connect the sensor to the controller. The wire is suitable for distances of up to 500 ft. Use a three-conductor shielded cable for the sensor and set point adjustment connections. The standard CCN communication cable may be used. If the set point adjustment (slidebar) is not required, then an unshielded, 18-gage or 20-gage, two-conductor, twisted pair cable may be used.

   The CCN service jack requires a separate, shielded CCN communication cable. Always use separate cables for CCN communication and sensor wiring. (Refer to Fig. 17-19 for wire terminations.)
7. Replace the cover by inserting the cover at the top of the mounting plate first, then swing the cover down over the lower portion. Rotate the two Allen head screws counterclockwise until the cover is secured to the mounting plate and locked in position.

NOTE: Clean sensor with damp cloth only. Do not use solvents. See Table 1 for resistance vs temperature data.



NOTE: Dimensions are in inches.

Fig. 16 — Space Temperature Sensor and Wall-Mounted Humidity Sensor Mounting

Wiring the Space Temperature Sensor (33ZCT55SPT, 33ZCT56SPT, 33ZCT57SPT) — The sensor wiring has the following requirements:

- Power requirements: 18 to 36 vac RMS 50/60 Hz at 4 va.
- All system wiring must be in compliance with all applicable local and national codes.
- A dedicated power supply is required for this sensor.
- All sensor wiring should be color-coded for ease of maintenance and service.
- Wiring should be 18 to 22 AWG (American Wire Gage) stranded wire (20 AWG is recommended).

To wire the sensor, perform the following (see Fig. 17-19):

1. Identify which cable is for the sensor wiring.
2. Strip back the jacket from the cables at least 3 inches. Strip $^1/_4$-in. of insulation from each conductor. Cut the shield and drain wire from the sensor end of the cable.
3. Connect the sensor cable as follows:
   a. Connect one wire from the cable (RED) to the SPT terminal on the controller. Connect the other end of the wire to the left terminal on the SEN terminal block of the sensor.
   b. Connect another wire from the cable (BLACK) to the GND terminal on the controller. Connect the other end of the wire to the remaining open terminal on the SEN terminal block (COM on 33ZCT57SPT).
   c. On 33ZCT56SPT and 33ZCT57SPT thermostats, connect the remaining wire (WHITE/CLR) to the T56 terminal on the controller. Connect the other end of the wire to the SET terminal on the sensor.
   d. In the control box, install a no. 10 ring-type crimp lug on the shield drain wire. Install this lug under the mounting screw of the zone controller.
   e. On 33ZCT56SPT thermostats, install a jumper between the two center terminals (right SEN and left SET). See Fig. 18.
   f. On 33ZCT57SPT thermostats, a separate 3-conductor, shielded cable is used to connect the fan speed wiring. Connect the SPD terminal on the thermostat to the SPEED terminal on the zone controller. Use the white/clear wire. Connect the COM terminal on the thermostat to the GND terminal on the zone controller. Use the black wire. Connect the 10V terminal on the thermostat to the +10V terminal on the zone controller. Use the red wire.

   In the control box, install a no. 10 ring-type crimp lug on the fan speed wiring shield drain wire. Install this lug under the mounting screw of the zone controller.

Wiring the CCN Communication Service Jack — See Fig. 17-19. To wire the service jack, perform the following:

1. Strip back the jacket from the CCN communication cable(s) at least 3 inches. Strip $^1/_4$-in. of insulation from each conductor. Remove the shield and separate the drain wire from the cable. Twist together all the shield drain wires and fasten them together using a closed end crimp lug or a wire nut. Tape off any exposed bare wire to prevent shorting.
2. Connect the CCN + signal wire(s) (RED) to Terminal 5.
3. Connect the CCN – signal wire(s) (BLACK) to Terminal 2.
4. Connect the CCN GND signal wire(s) (WHITE/CLR) to Terminal 4.

Before wiring the CCN connection, refer to Connect the CCN Communication Bus section for communication bus wiring and cable selection. The cable selected must be identical to the CCN communication bus wire used for the entire network.

The other end of the communication bus cable must be connected to the remainder of the CCN communication bus. If the cable is installed as a T-tap into the bus, the cable length cannot exceed 50 ft. No more than 10 T-taps are allowed per bus. Wire the CCN service jack of the sensor in a daisy chain arrangement with other equipment. See Fig. 20. Refer to the Connect to the CCN Communication Bus section for additional details.

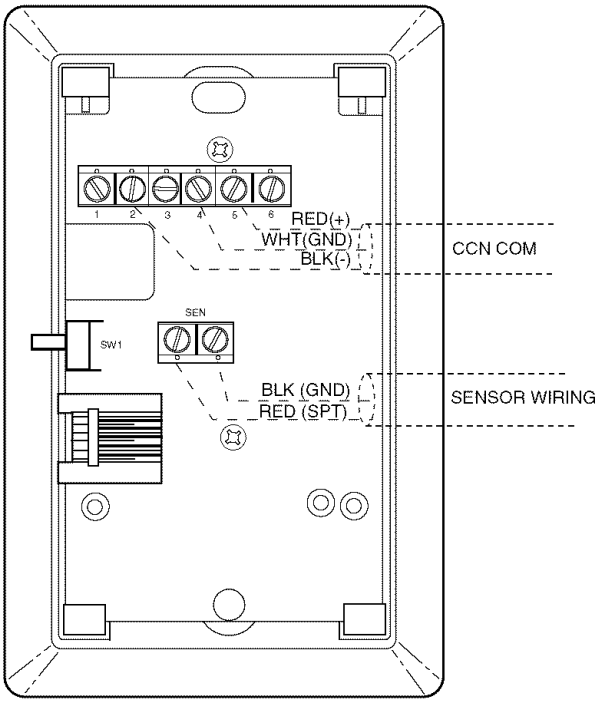


Fig. 17 — Space Temperature Sensor Wiring (33ZCT55SPT)

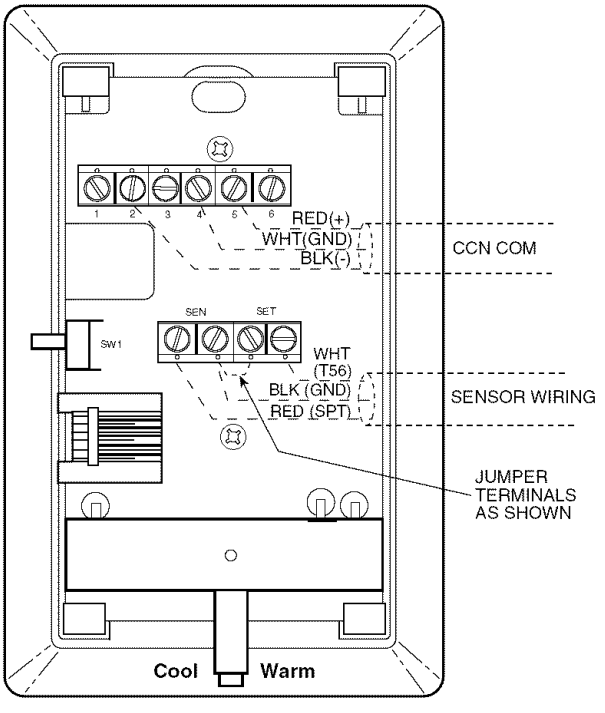
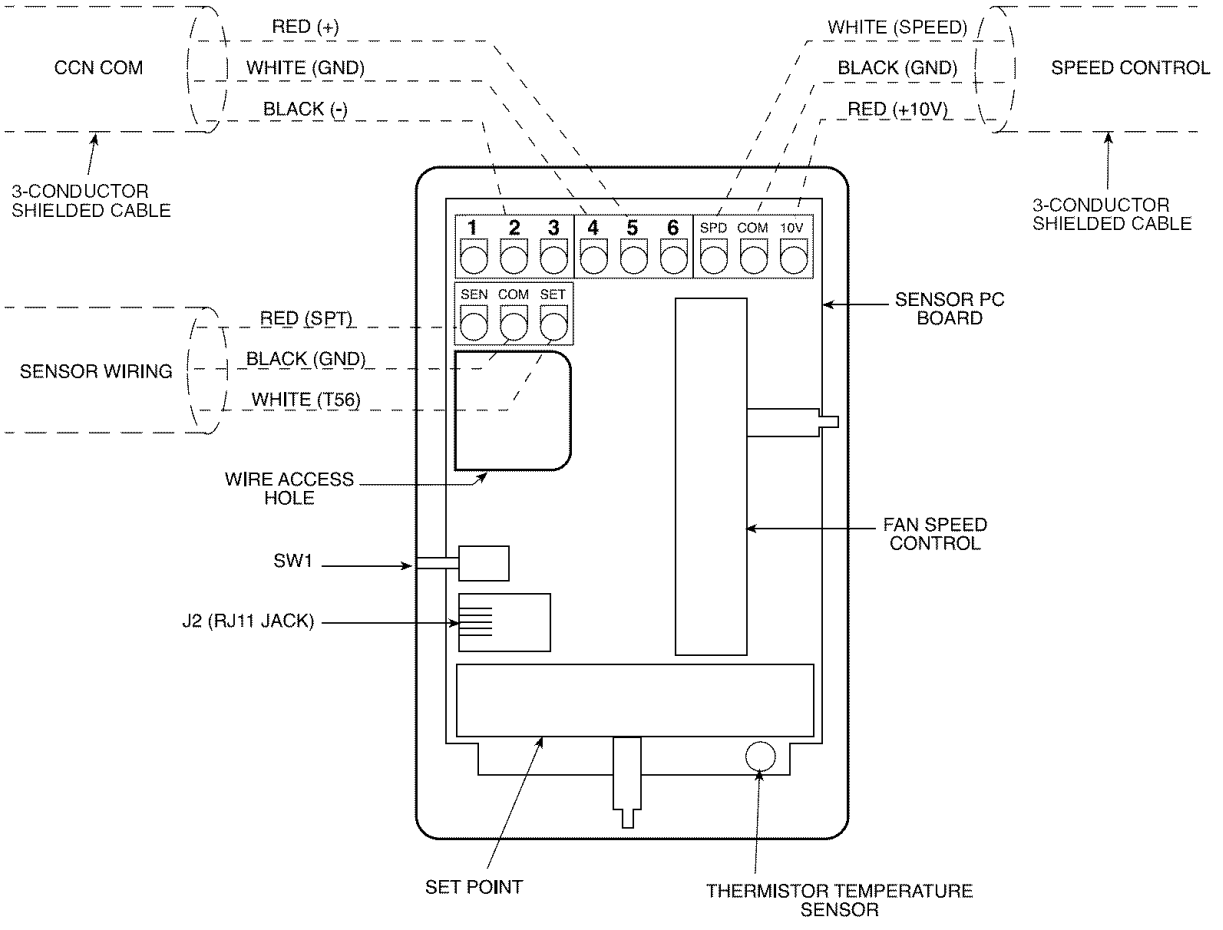


Fig. 18 — Space Temperature Sensor Wiring (33ZCT56SPT)



LEGEND

CCN — Carrier Comfort Network®
SW1 — Switch
Set Point — Set Point Adjust

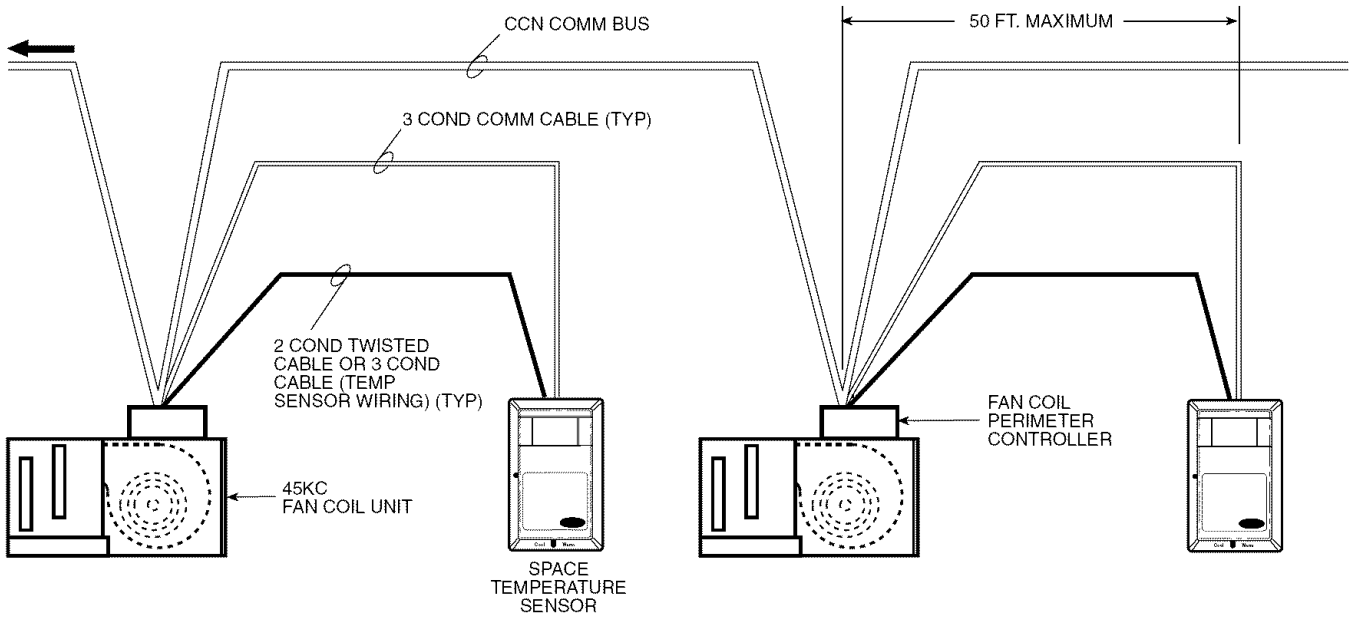
NOTE: Do not connect white wire to SET terminal if set point adjustment is not needed.

Fig. 19 — Space Temperature Sensor Wiring (33ZCT57SPT)

Table 1 — Thermistor Resistance vs Temperature Values for Space Temperature Sensor, Return-Air Temperature Sensor, and Supply-Air Temperature Sensor

TEMP (C)	TEMP (F)	RESISTANCE (Ohms)
0	32	32,651
5	41	25,395
10	50	19,903
15	59	15,714
20	68	12,494
25	77	10,000
30	86	8,056
35	95	6,530
40	104	5,325
45	113	4,367
50	122	3,601

Wiring when distance between fan coil controller and space temperature sensor is 50 feet or less:


CCN COMM BUS
50 FT. MAXIMUM
3 COND COMM CABLE (TYP)
2 COND TWISTED CABLE OR 3 COND CABLE (TEMP SENSOR WIRING) (TYP)
FAN COIL PERIMETER CONTROLLER
45KC FAN COIL UNIT
SPACE TEMPERATURE SENSOR

Wiring when distance between fan coil controller and space temperature sensor is greater than 50 feet:

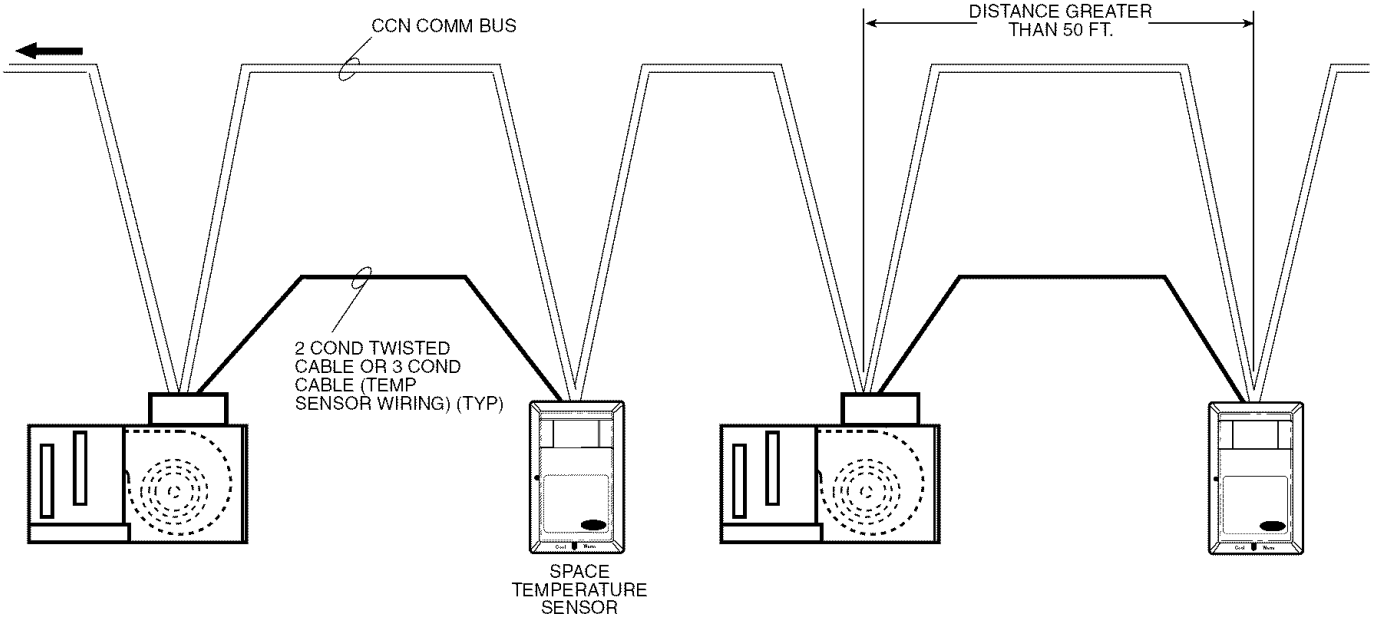

CCN COMM BUS
DISTANCE GREATER THAN 50 FT.
2 COND TWISTED CABLE OR 3 COND CABLE (TEMP SENSOR WIRING) (TYP)
SPACE TEMPERATURE SENSOR

Fig. 20 — Communication Bus Wiring (42KC Perimeter Fan Coil Zone Controller Shown)

SUPPLY-AIR TEMPERATURE (SAT) SENSOR INSTALLATION — The SAT sensor is required and must be installed in the fan coil air outlet. The part number is 33ZCSENSAT.

The SAT sensor probe is 6 inches in length. See Fig. 9.

When using a ducted supply, the supply-air temperature sensor should be located in the supply duct downstream of the discharge of the fan coil to allow good mixing of the supply airstream.

See Fig. 21 for mounting location. See Fig. 22 for mounting hole requirements.

⚠ WARNING

Disconnect electrical power before wiring the zone controller. Electrical shock, personal injury, or damage to the zone controller can result.

⚠ CAUTION

Do not run sensor or relay wires in the same conduit or raceway with Class 1 AC service wiring. Do not abrade, cut, or nick the outer jacket of the cable. Do not pull or draw cable with a force that may harm the physical or electrical properties. Avoid splices in any control wiring. Damage to the 33ZCPLNCTL zone controller can result.

Perform the following steps to connect the SAT sensor to the zone controller:

1. Locate the opening in the control box. Pass the sensor probe through the hole.
2. Drill or punch a $^1/_2$-in. hole in the fan coil unit. See Fig. 22.
3. Use two field-supplied, self-drilling screws to secure the sensor probe to the fan coil unit.
4. Connect the sensor leads to the zone controller's wiring harness terminal board at the terminals labeled SAT (RED) and GND (BLK).

Perform the following steps if state or local code requires the use of conduit, or if sensor installation requires a cable length of more than 8 ft:

1. Secure the probe to the fan coil unit with two field-supplied self-drilling screws.
2. If extending cable length beyond 8 ft, use plenum rated, 20 AWG, twisted pair wire.
3. Connect the sensor leads to the zone controller's wiring harness terminal board at the terminals labeled SAT (RED) and GND (BLK).
4. Neatly bundle and secure excess wire.

INDOOR-AIR QUALITY (CO_2) SENSOR INSTALLATION — The indoor-air quality (CO_2) sensor accessory monitors carbon dioxide levels, which provide information used to monitor indoor air quality. Three types of sensors are provided. The wall sensor can be used to monitor the conditioned air space. Sensors use infrared technology to measure the levels of CO_2 present in the air. The wall sensor is available with or without an LCD readout to display the CO_2 level in ppm. See Fig. 11.

Sensor accessory descriptions and part numbers are shown in Table 2. To mount the sensor, refer to the installation instructions shipped with the accessory kit.

Table 2 — CO_2 Sensor Accessories

CO_2 SENSOR ACCESSORY PART NUMBERS	DESCRIPTION
33ZCSENCO2	Wall Mount Sensor (with display)
33ZCT55CO2	Wall Mount Sensor with 33ZCT55SPT space temperature sensor (no display)
33ZCT56CO2	Wall Mount Sensor with 33ZCT56SPT space temperature sensor and set point adjustment (no display)

The CO_2 sensors listed in Table 3 are factory-set for a range of 0 to 2000 ppm and a linear voltage output of 0 to 10 vdc. Refer to the instructions supplied with the CO_2 sensor for electrical requirements and terminal locations.

To accurately monitor the quality of the air in the conditioned air space, locate the sensor near a return air grille (if present) so it senses the concentration of CO_2 leaving the space. The sensor should be mounted in a location to avoid direct breath contact.

Do not mount the CO_2 sensor in drafty areas such as near supply ducts, open windows, fans, or over heat sources. Allow at least 3 ft between the sensor and any corner. Avoid mounting the sensor where it is influenced by the supply air; the sensor gives inaccurate readings if the supply air is blown directly onto the sensor or if the supply air does not have a chance to mix with the room air before it is drawn into the return airstream.

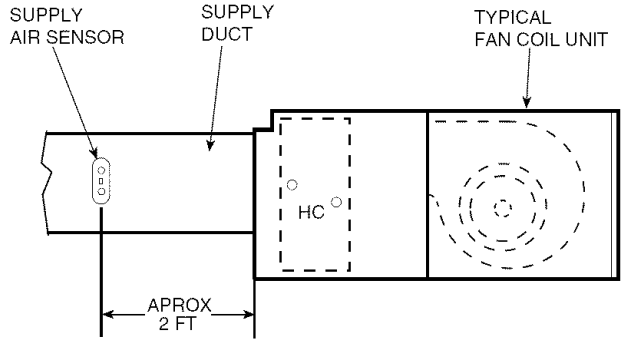


Fig. 21 — Supply Air Temperature Sensor Mounting Location (42KC)

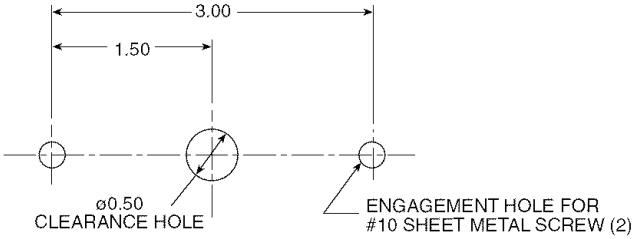


Fig. 22 — Supply Air Temperature Sensor Mounting

Indoor-Air Quality Sensor Wiring — To wire the sensors after they are mounted in the conditioned air space or outdoor location, see Fig. 23 and the instructions shipped with the sensors. For each sensor, use two 2-conductor 18 AWG twisted-pair cables (unshielded) to connect the separate isolated 24 vac power source to the sensor and to connect the sensor to the control board terminals. To connect the sensor to the control board, identify the positive (0-10 VDC) and ground (SIG COM) terminals on the sensor. Connect the +10 VDC terminal to terminal IAQ and connect the SIG COM terminal to terminal GND.

RELATIVE HUMIDITY SENSOR (WALL-MOUNTED) INSTALLATION — The relative humidity sensor accessory is installed on an interior wall to measure the relative humidity of the air within the occupied space. See Fig. 12.

The use of a standard 2 x 4 in. electrical box to accommodate the wiring is recommended for installation. The sensor can be mounted directly on the wall, if acceptable by local codes.

If the sensor is installed directly on a wall surface, install the humidity sensor using 2 screws and 2 hollow wall anchors (field-supplied); *do not overtighten screws.* See Fig. 16.

⚠ CAUTION

Do NOT clean or touch the sensing element with chemical solvents; they can permanently damage the sensor.

The sensor must be mounted vertically on the wall. The Carrier logo should be oriented correctly when the sensor is properly mounted.

DO NOT mount the sensor in drafty areas such as near heating or air-conditioning ducts, open windows, fans, or over heat sources such as baseboard heaters, radiators, or wall-mounted light dimmers. Sensors mounted in those areas will produce inaccurate readings.

Avoid corner locations. Allow at least 4 ft between the sensor and any corner. Airflow near corners tends to be reduced, resulting in erratic sensor readings.

Sensor should be vertically mounted approximately 5 ft up from the floor, beside the space temperature sensor.

For distances up to 500 feet, use a 3-conductor, 18 or 20 AWG cable. A CCN communication cable can be used, although the shield is not required. The shield must be removed from the sensor end of the cable if this cable is used. See Fig. 24 for wiring details.

The power for the sensor is provided by the control board. The board provides 24 vdc for the sensor. No additional power source is required.

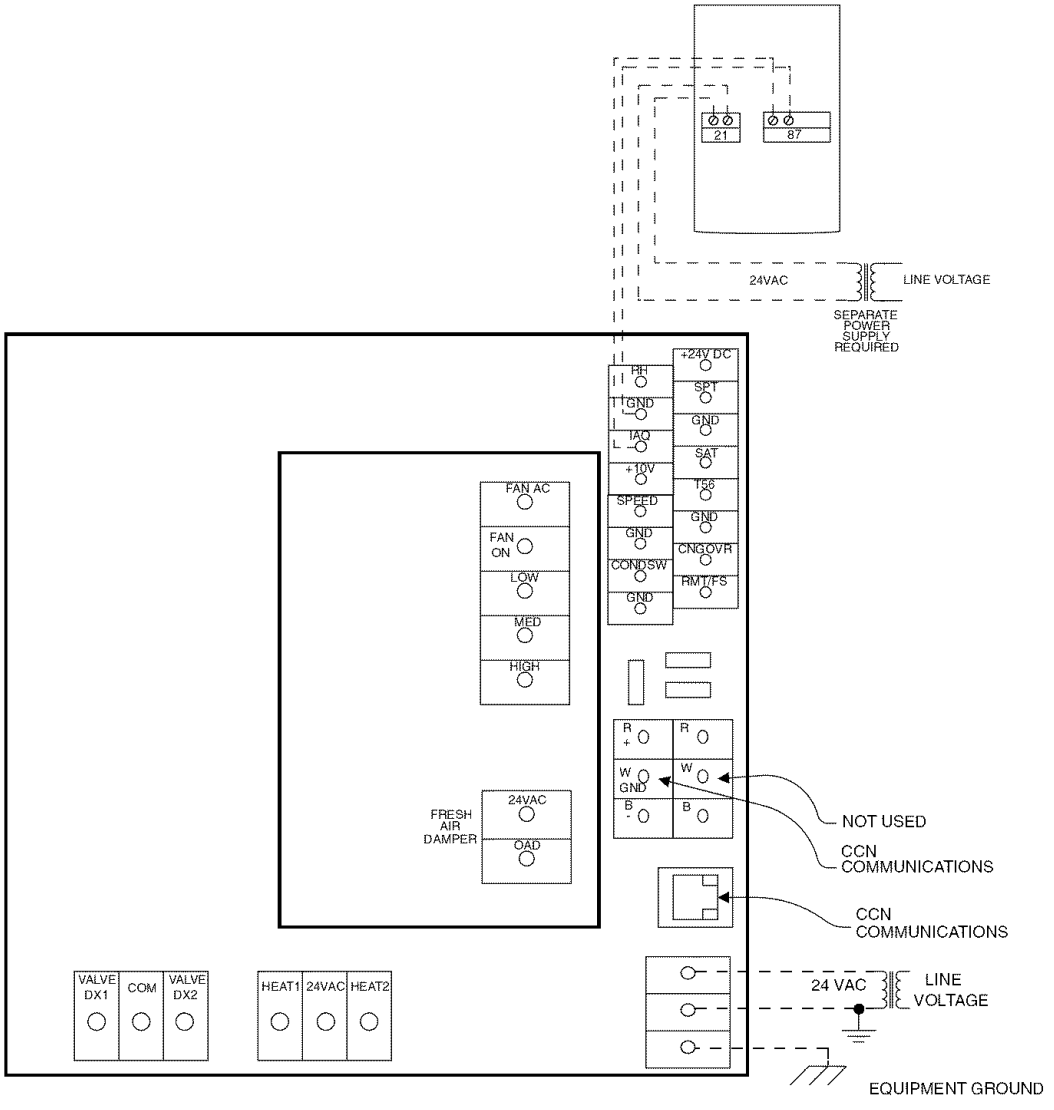


Fig. 23 — CO_2 Sensor Wiring (42KC Controller Shown)

To wire the sensor, perform the following:

1. At the sensor, remove 4-in. of jacket from the cable. Strip $^1/_4$-in. of insulation from each conductor. Route the cable through the wire clearance opening in the center of the sensor.
2. Connect the RED wire to the sensor screw terminal marked (+).
3. Install one lead from the resistor (supplied with the sensor) and the WHITE wire into the sensor screw terminal marked (–). After tightening the screw terminal, test the connection by pulling gently on the resistor lead.
4. Connect the remaining lead from the resistor to the BLACK wire and secure using a field-supplied closed end type crimp connector or wire nut.
5. Using electrical tape, insulate any exposed resistor lead to prevent shorting.
6. At the control box, remove the jacket from the cable.
7. Strip $^1/_4$-in. of insulation from each conductor.
8. Connect the RED wire to terminal 24 VDC on the control board.

   NOTE: The 24 VDC terminal is used for rh sensor wiring only.
9. Connect the BLACK wire to terminal GND on the control board.
10. Connect the WHITE/CLEAR wire to terminal RH on the control board.
11. Connect shield to earth ground (if shielded wire is used).

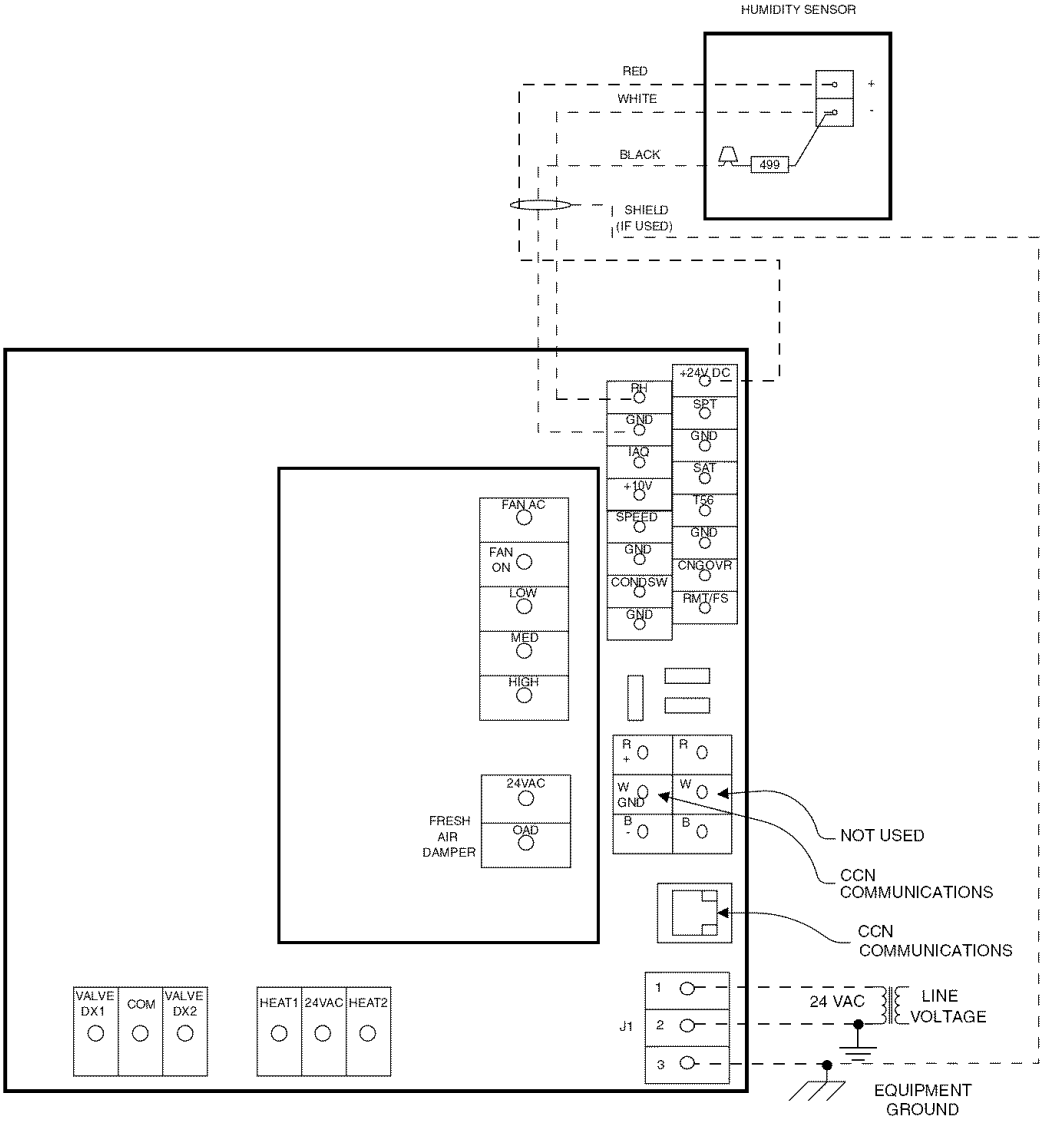


Fig. 24 — Humidity Sensor Wiring (42KC Controller Shown)

CO_2 AND SPACE TEMPERATURE SENSORS (Optional) — The CO_2 and space temperature sensors are comprised of two sensors housed in one unit. They are designed to monitor carbon dioxide (CO_2) levels in the air and measure the interior building temperature.

Two models are available: P/N 33ZCT55CO2, and P/N 33ZCT56CO2, which has a set point adjustment potentiometer. Both models include a push-button override that may be disabled through controller software. See Table 3 for sensor specifications. To convert the CO_2 sensor into a duct-mounted CO_2 sensor, the duct-mounted aspirator (33ZCASPCO2) will need to be purchased.

Refer to the instructions supplied with the CO_2 sensor for electrical requirements and terminal locations. The zone controller requires 24 vac 25 va transformer to provide power to the sensor.

IMPORTANT: The CO_2 and space temperature sensor should be wall-mounted in the occupied space to accurately measure the ventilation delivered to that zone.

Do NOT mount the sensor in the return air duct.

NOTE: There are 2 locking screws provided on the bottom of the cover for security. A special tool is required to remove and install the cover if the locking screws are used.

The sensor consists of the following hardware:

1 — sensor top
1 — sensor base
1 — mounting plate
2 — machine screws (6 x 32)
2 — locking screws

⚠ WARNING

Before performing service or maintenance operations on the system, turn off main power switches to the unit. Electric shock can cause personal injury.

Table 3 — Performance Specification (P/N 33ZCT55CO2 and 33ZCT56CO2)

FEATURE	SPECIFICATION	
Sensing Method	Single Beam Absorption Infrared™ Patented TEMA self calibration software and 10K temperature sensor	
Sample Method	Diffusion	
Measurement Range	0 to 2000 ppm	
Sensitivity	± 20 ppm	
Accuracy	± 100 ppm 60 to 90 F: 760 mmHg (15 to 32 C)	
Pressure Dependency	0.13% of reading per mmHg	
Response Time 0 to 90% Step Change	<2 minutes	
Warm-Up Time at 77 F (25 C)	<2 minutes	
Operating Conditions	32 to 122 F (0° to 50 C) 0 to 99% RH, non-condensing	
Storage Temperatures	–4 to +158 F (–20 to 70 C)	
Agency Certification	FCC Part 15 Class B/CE/CA Energy Commission	
Calibration/Interval	Lifetime self-calibrating after 14 days of run time.*	
Power	18-30 vac RMS, 50/60 Hz — half wave rectified (dedicated) 18-42 VDC polarity protected (dedicated) 1.75 VA maximum average power 2.75 VA peak power	
Analog CO_2 Output	4-20 mA (Rlmax = 500 Ohms) and 0-10 V (Source 100 mA, Sink 10 mA)	
Temperature Sensor	10 KΩ Thermistor, 10 KΩ ± 2.5% at 77 F (25 C)	
Temperature Control (P/N 33ZCT56CO2 only)	Equipped with a slide potentiometer.	
	Positions	Resistance
	Left (Stop)	0 K (+ 5 K)
	Right (Stop)	100 K ± 10 K
Override Control	Equipped with a push button that, when depressed, shorts out its internal thermistor.	
Reliability	Meets applicable Carrier reliability requirements	

LEGEND

KΩ — Kilo-ohm (1000 ohms)
RH — Relative Humidity
RMS — Root Mean Square
TEMA — Time Extended Measurement

*Automatic background calibration (ABC Logic™) is a patented self-calibration procedure that is designed to be used in applications where CO_2 concentrations will drop to outdoor ambient conditions (approximately 400 ppm) at least 3 times in a 14-day period (typically during unoccupied periods).

Step 1 — Space Temperature Sensor Location — The sensor should be mounted:

- on an internal wall near a return air grille or duct
- at least 3 ft from any corner, 2 ft from an open doorway and 4 to 6 ft from the floor
- proximal to the wiring egress on the wall
- where temperature operating limits are 32 to 122 F

The sensor should **NOT** be mounted:

- close to a window, on an outside wall, or next to a door leading to the outside
- close to or in direct airflow of areas such as open windows, drafts or over heat sources
- in areas with poor air circulation, such as behind a door or in an alcove in areas where there are dramatic temperature fluctuations or moisture accumulation
- where it is influenced by supply air as the sensor will give an inaccurate reading
- where it may be exposed to direct occupant breathing, such as near water coolers or coffee machines.

Step 2 — Mounting the Space Temperature Sensor — The sensor can be mounted on a surface, wall or in a junction box. See Fig. 25-28.

NOTE: Before mounting the sensor, disassemble the sensor into three parts. See Fig. 27.

Surface or Wall Mounting

1. Place the mounting plate on the wall. Mark the desired location of the two mounting holes on the wall through the holes in the mounting plate. See Fig. 25.
2. Pull the wires through the wire hole in the middle of the mounting plate.
3. Drill two mounting holes in the wall in the location marked in Step 1.
4. Mount the sensor mounting plate with two wood screws and anchors (field-supplied).

Junction Box Mounting

1. Run wires through knockout in a 2 x 4 in. junction box (field-supplied).
2. Pull wires through the wire hole in the middle of the mounting plate.
3. Secure the sensor mounting plate to the junction box using the two 6 x 32 machine screws (included).

Step 3 — Wiring the Space Temperature Sensor — Perform the following procedure to wire the sensor:

1. Run the wall wiring through the wire hole in the sensor base. See Fig. 26.
2. Align the top clips and secure the bottom clips of the sensor base to the wall mount plate. See Fig. 27.
3. Gently rock the case from top to bottom, using minimal pressure. A "snap" sound will indicate that the sensor is secure. See Fig. 27.
4. Separate the wires into two bundles. One bundle should contain the wires for the CO_2 sensor (J4 and J1) and the other bundle should contain the wires for the temperature sensor and CCN (J5 and J6). See Table 4 and Fig. 28.
5. Terminate the wires to J1, J4, J5, and J6. See Table 4 and Fig. 28.
6. Push excess wire back through the hole. Align the sensor top over the sensor base.
7. Install the cover on the sensor. Two Allen wrench locking screws are provided to lock the cover onto the sensor for security reasons. They are located on the bottom of the cover. See Fig. 27.

Step 4 — Space Temperature Sensor Start-Up — Perform the following procedure to start up the sensor:

Once the installation is complete, apply power to the sensor. A two-minute warm-up will take place. After two minutes, the LED indicator light will be solid.

Measure and read the temperature and CO_2 sensor levels by using a meter or checking the readings at the attached controller. Be sure the CO_2 levels are above the minimum, up to the maximum acceptable level in the range.

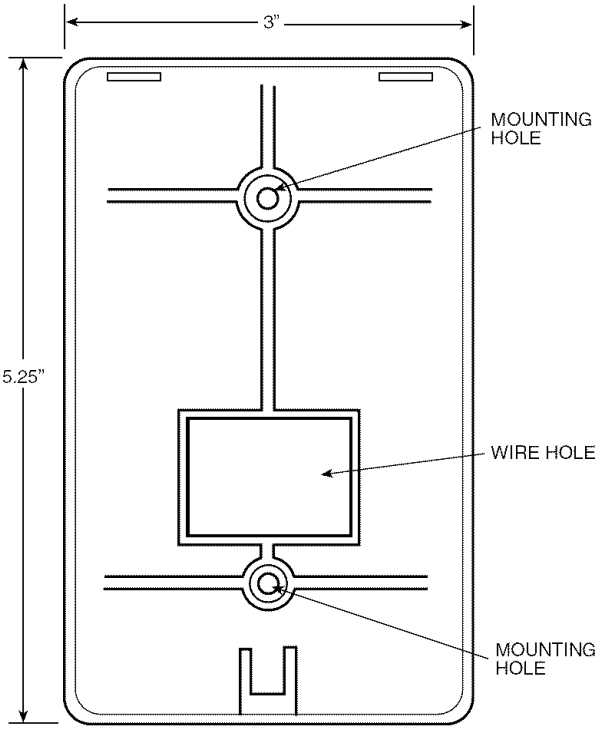
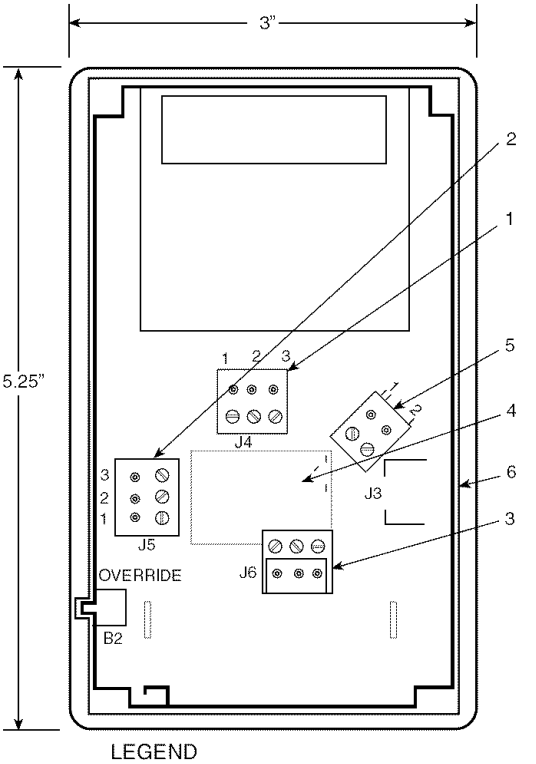


Fig. 25 — CO_2 and Space Temperature Sensor Mounting Plate



LEGEND

1 — 3-Pin Terminal Block — Signal Out
2 — 3-Pin Terminal Block — Temp Sensor
3 — 3-Pin Terminal Block — CCN
4 — Wiring Access — 1.21 in. x .75 in.
5 — 2-Pin Terminal Block — Power In
6 — RJ14 Connector — Service Communication

Fig. 26 — CO_2 and Space Temperature Sensor Base — Terminal Connections

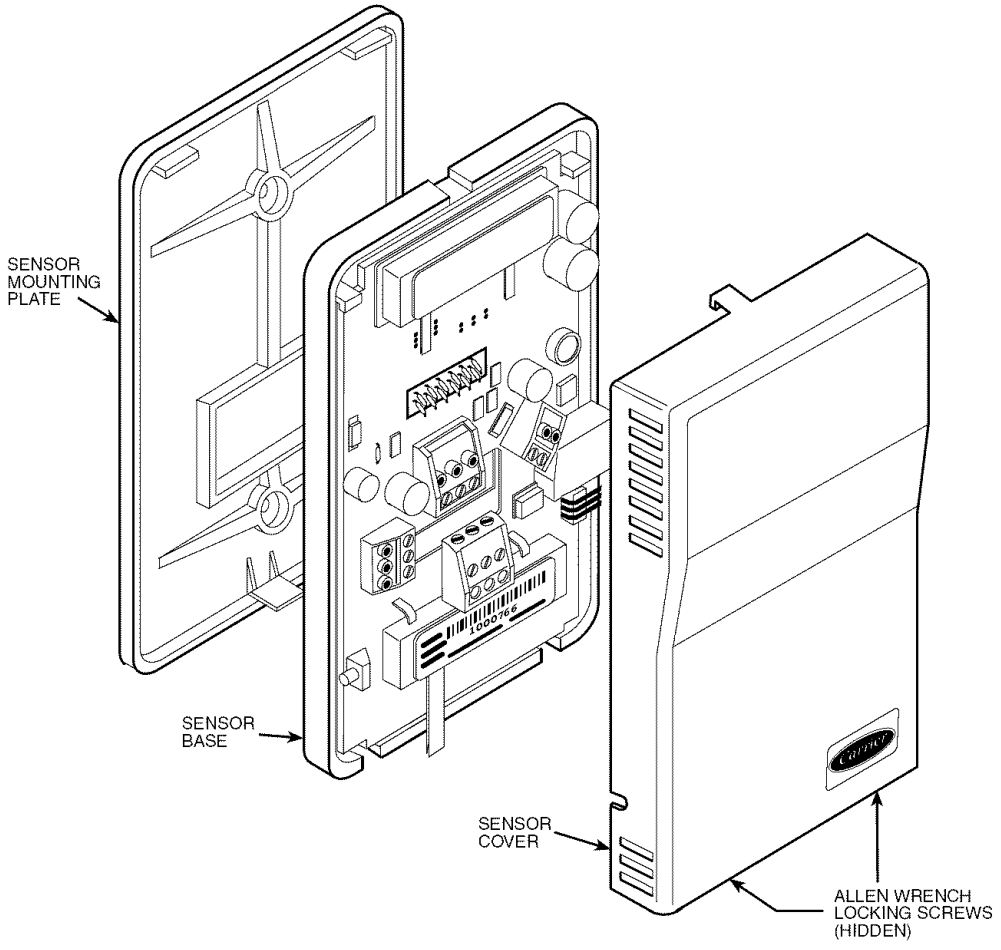


Fig. 27 — Sensor Assembly

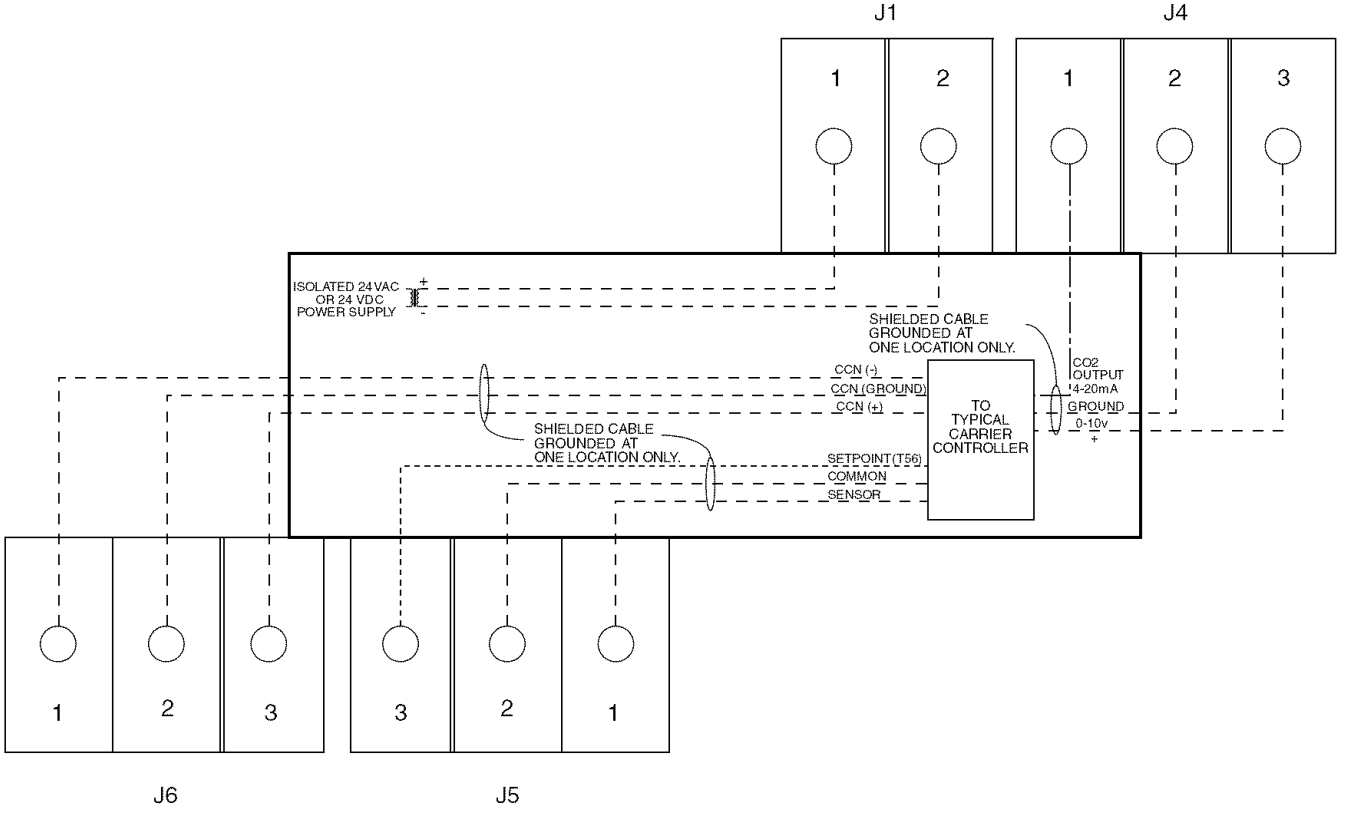


Fig. 28 — CO_2 and Space Temperature Sensors — Typical Field Wiring (P/N 33ZCT55CO2, 33ZCT56CO2)

Table 4 — CO_2 and Space Temperature Sensors — Electrical Connections (P/N 33ZCT55CO2, 33ZCT56CO2)

CONNECTOR	TERMINAL DESIGNATION
J1	2-Pin Power Terminal 1 — 24VAC (+) (Dedicated Power Supply) 2 — 24VAC (–) (Dedicated Power Supply)
J3	RJ14 Connector CCN Service Communication 1 — Not Used 2 — CCN (+) 3 — CCN Ground 4 — Not Used 5 — CCN (–) 6 — Not Used
J4	3-Pin Terminal Signal Out 1 — 4-20 mA CO_2 Output 2 — Common CO_2 Output 3 — 0-10VDC CO_2 Output
J5	3-Pin Terminal Temp Sensor 1 — Thermistor 2 — Common 3 — Temperature Offset
J6	3-Pin Terminal CCN Communications 1 — CCN (–) 2 — CCN Ground 3 — CCN (+)

LEGEND

CCN — Carrier Comfort Network®

45XC Input and Output Connectors — The 45XC zone controller inputs are shown in Fig. 29. Outputs (fan, staged heat) are shown in Fig. 30. All available controller outputs are factory wired.

Inputs (J4)

CHANNEL	J4 PINS (+,–)	DESCRIPTION	CONTROL DEVICE
SPT	4, 6	Space Temperature	10K Thermistor
SAT	6, 8	Supply Air Temperature	10K Thermistor
SP_OFFSET	10, 12	Set Point Offset Adjust	100K Potentiometer
PATEMP	12, 14	Primary Air Temperature	10K Thermistor
RH/IAQ	16 (24 VDC), 15 (+), 13 (–)	RH/IAQ Sensor	2-10 VDC
DMPPOS	9 (10 VDC) 7 (W+), 5 (–)	Damper Position	0-10 VDC
PRIFLO	N/A	Plenum Pressure Sensor	0-5 VDC
REMTCIN	2 (24 VAC), 6 (–)	Unoccupied Override Input	0/24 VAC

LEGEND

IAQ — Indoor Air Quality
PATEMP — Primary Air Temperature
RH — Relative Humidity
SAT — Supply-Air Temperature
SP — Set Point
SPT — Space Temperature

NOTE: The 24 v connection (J4-16) is required for RH sensor only.

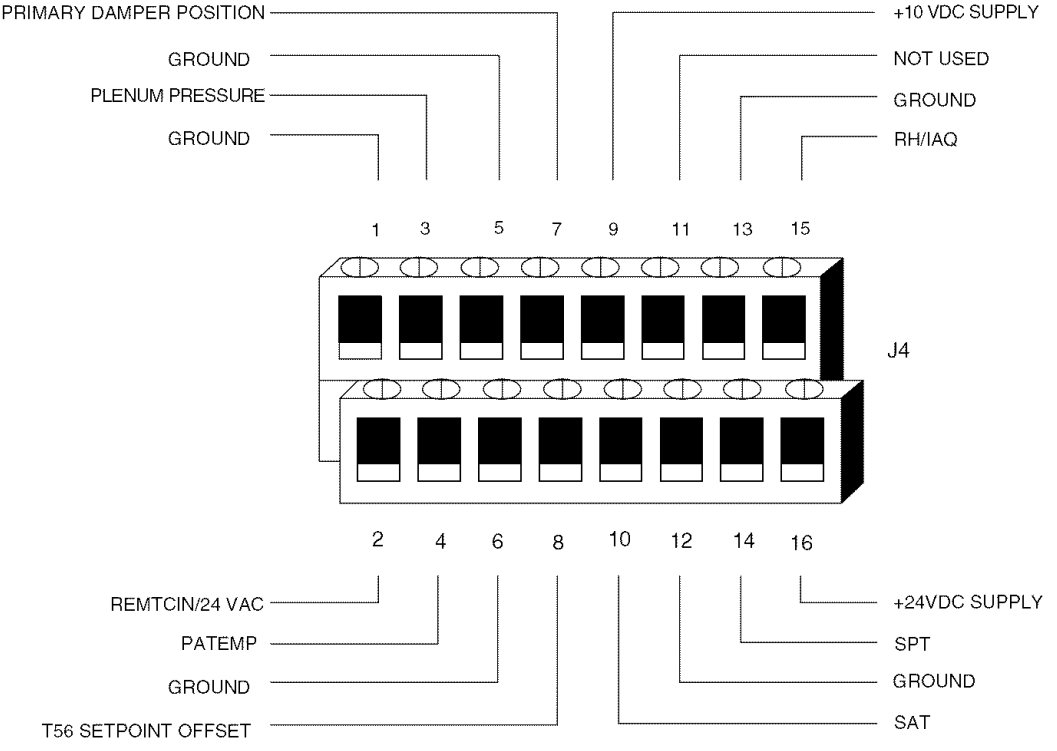


Fig. 29 — 45XC Input Connectors

Outputs (J5)*

CHANNEL	J5 TERMINATIONS	DESCRIPTION	CONTROL DEVICE
DMPR_CCW	1, 2	Primary Damper CCW	24 VAC, 1A
DMPR_CW	2, 3	Primary Damper CW	24 VAC, 1A
HEAT_ST1	4, 5	Fan 1 (Increase)	24 VAC, 1A
HEAT_ST2	5, 6	Fan 1 (Decrease)	24 VAC, 1A

LEGEND

CCW — Counterclockwise
CW — Clockwise

* All outputs are factory wired.

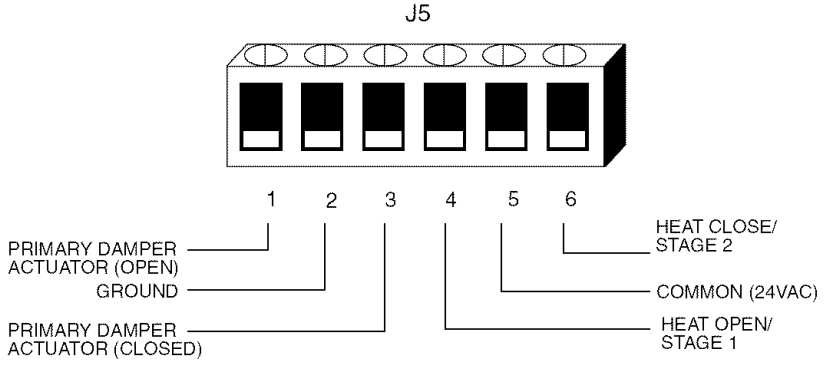


Fig. 30 — 45XC Output Connectors

Connect to the CCN Communication Bus —

All controllers connect to the bus in a daisy chain arrangement. The zone controller may be installed on a primary CCN bus or on a secondary bus from the primary CCN bus. Connecting to a secondary bus is recommended.

At any baud (9600, 19200, 38400 baud), the number of controllers is limited to 239 zones maximum. When Carrier linkage thermostats are used on the same bus as fan coil units, no more than 128 fan coils and 12 linkage thermostats may be on the same bus. Bus length may not exceed 4000 ft, with no more than 60 total devices on any 1000 ft section. Optically isolated RS-485 repeaters are required every 1000 ft.

NOTE: Carrier thermostats operate at 9600 band.

The first zone controller in a network connects directly to the bridge and the others are wired sequentially in a daisy chain fashion. Refer to Fig. 20 for an illustration of CCN communication bus wiring.

The CCN communication bus may also connect to the zone controller space temperature sensor. Refer to the 45XC Sensor Installation section for sensor wiring instructions.

COMMUNICATION BUS WIRE SPECIFICATIONS — The CCN Communication Bus wiring is field-supplied and field-installed. It consists of shielded three-conductor cable with drain (ground) wire. The cable selected must be identical to the CCN Communication Bus wire used for the entire network. See Table 5 for recommended cable.

Table 5 — Recommended Cables

MANUFACTURER	CABLE PART NO.
Alpha	2413 or 5463
American	A22503
Belden	8772
Columbia	02525

NOTE: Conductors and drain wire must be at least 20 AWG (American Wire Gage), stranded, and tinned copper. Individual conductors must be insulated with PVC, PVC/nylon, vinyl, Teflon, or polyethylene. An aluminum/polyester 100% foil shield and an outer jacket of PVC, PVC/nylon, chrome vinyl, or Teflon with a minimum operating temperature range of –20 C to 60 C is required.

CONNECTION TO THE COMMUNICATION BUS

1. Strip the ends of the red, white, and black conductors of the communication bus cable.
2. Connect one end of the communication bus cable to the bridge communication port labeled COMM2 (if connecting on a secondary bus).

   When connecting the communication bus cable, a color code system for the entire network is recommended to simplify installation and checkout. See Table 6 for the recommended color code.

Table 6 — Color Code Recommendations

SIGNAL TYPE	CCN BUS WIRE COLOR	PLUG PIN NUMBER
+	Red	1
Ground	White	2
–	Black	3

3. Connect the other end of the communication bus cable to the terminal block labeled CCN in the zone controller of the first air terminal. Following the color code in Table 6, connect the Red (+) wire to Terminal 1. Connect the White (ground) wire to Terminal 2. Connect the Black (–) wire to Terminal 3.
4. Connect additional zone controllers in a daisy chain fashion, following the color coded wiring scheme in Table 6. Refer to Fig. 20.

NOTE: The communication bus drain wires (shield) must be tied together at each zone controller. If the communication bus is entirely within one building, the resulting continuous shield must be connected to ground at only one single point. If the communication bus cable exits from one building and enters another building, connect the shields to ground at a lightning suppressor in each building where the cable enters or exits (one point only).

Connect Air Pressure Tubing

CONTROL PACKAGE 4840 — The underfloor controller measures the pressure differential between the plenum high and the occupied space low. See Fig. 1. The field-supplied and field-installed piping are connected to barb fittings on the underfloor controller with $^1/_4$-in. flame retardant polyethylene tubing. All piping for this purpose must be plenum rated and must conform to local codes.

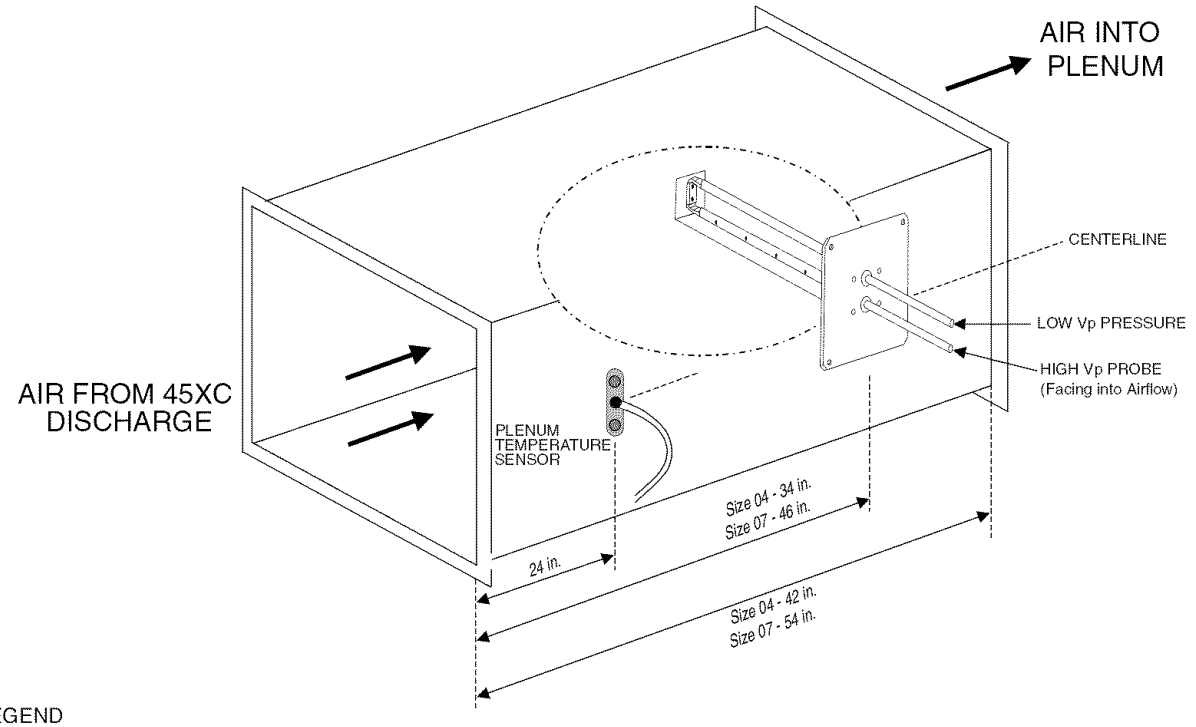
Figure 15A indicates the positions of the two barb fittings.

Perform the following steps to install and connect the air pressure tubing:

1. Select a location where the airflow tube will be installed. The location should be one that is away from the unit's discharge into the plenum and halfway between that point and the farthest diffuser. If this requirement is not met, stable airflow measurements may not be possible.
2. Mount the tubing in the plenum securely.
3. Use field-supplied $^1/_4$-in. tubing (rated for the application) to connect the high pressure airflow pickup to barb fitting P1 on the pressure transducer. At the underfloor controller, be careful to avoid sharp bends in the tubing, because malfunctions may occur if the tubing is bent too sharply. Use at least 2 ft of tubing for reading stability.
4. Use field-supplied $^1/_4$-in. tubing (rated for the application) to connect the low pressure fitting P2 on the pressure transducer to the occupied space. Be careful to avoid sharp bends in the tubing because malfunctions may occur if the tubing is bent too sharply. Use at least 2 ft of tubing for stability.
5. The $^3/_8$-in. OD tubing is limited to 25 ft maximum length for accurate measurement and response. For lengths up to 50 ft, use $^1/_4$-in. OD tubing. Do not exceed 50 ft tube lengths for either the low or high pressure connections.

CONTROL PACKAGE 4841 (Fig. 31) — Locate the airflow probe as shown in Fig. 15B. Perform the following steps to install and connect the air pressure tubing:

1. Drill a rectangular shaped hole in the ductwork.
2. Securely mount the airflow probe with the high pressure side (black and red tubing) facing into the airflow from the 45XC terminal.
3. The probe is supplied with 10 ft of tubing from the factory. If required, it may be extended up to 25 ft using field-supplied $^1/_4$ in. OD, flame retardant tubing.



LEGEND

V_P — Velocity Pressure

NOTE: Supply Duct View rotated to show component location.

Fig. 31 — Component Installation (Control Package 4841)

45UC UNDERFLOOR SERIES FAN-POWERED TERMINAL INSTALLATION

Physical components of the 45UC underfloor series fan-powered terminal is detailed in Fig. 32. Figure 33 shows 45UC underfloor terminal unit dimensions and weight data.

45UC Hardware — The 45UC underfloor fan-powered unit contains the 33ZCFANTRM underfloor controller.

Figure 34 shows the underfloor controller physical details.

45UC Field-Supplied Hardware — Each 45UC underfloor fan-powered unit requires the following field-supplied components to complete its installation:

- transformer — 24 vac, 40 va (standard applications)
- contactors (as required for electric heat)
- space temperature sensor (33ZCT55SPT, 33ZCT56SPT, or 33ZCT57SPT)
- supply-air temperature sensor (33ZCSENSAT) with two no. 10 x $^1/_2$-in. sheet metal screws (to secure SAT sensor to supply duct)
- primary-air temperature sensor
- changeover sensor (required for 2-pipe applications)
- indoor-air quality (CO_2) sensor (optional)
- relative humidity sensor (optional)
- valve and actuator for hot water heat (optional)

SPACE TEMPERATURE SENSOR (Fig. 8) — Each underfloor controller requires a field-supplied Carrier space temperature sensor. There are three sensors available for this application:

- 33ZCT55SPT, space temperature sensor with override button
- 33ZCT56SPT, space temperature sensor with override button and set point adjustment
- 33ZCT57SPT, space temperature sensor with override button, set point adjustment, and manual fan speed control

SUPPLY-AIR TEMPERATURE (SAT) Sensor (Fig. 9) — The underfloor controller must be connected to a field-supplied supply air temperature (SAT) sensor (P/N 33ZCSENSAT) to monitor the temperature of the air delivered by the fan coil.

PRIMARY-AIR TEMPERATURE SENSOR (PAT) (Optional) — A field-supplied, primary air temperature (PAT) sensor (P/N 33ZCSENPAT) is used on an underfloor controller that is functioning as a linkage master for a non CCN/linkage compatible air source. See Fig. 10.

INDOOR-AIR QUALITY (CO_2) SENSOR (Fig. 11) — An indoor air quality sensor is required for indoor air quality monitoring. Three different CO_2 sensors are available for zone CO_2 level monitoring.

- The 33ZCSENCO2 sensor is an indoor, wall-mounted sensor with an LED (light-emitting diode) display.
- The 33ZCT55CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button.
- The 33ZCT56CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button and temperature offset.

RELATIVE HUMIDITY SENSOR (Fig. 12) — The relative humidity sensor (P/N 33AMSENRHS000) is an indoor, wall-mounted sensor and is required for zone humidity control (dehumidification).

CHANGEOVER SENSOR — The underfloor controller uses the changeover sensor (33ZCSENCHG) in 2-pipe applications to determine if it is capable of providing heating or cooling to the space based on the temperature of the heating and cooling medium supplied to the unit from the building piping system. This value may be broadcast to other units.

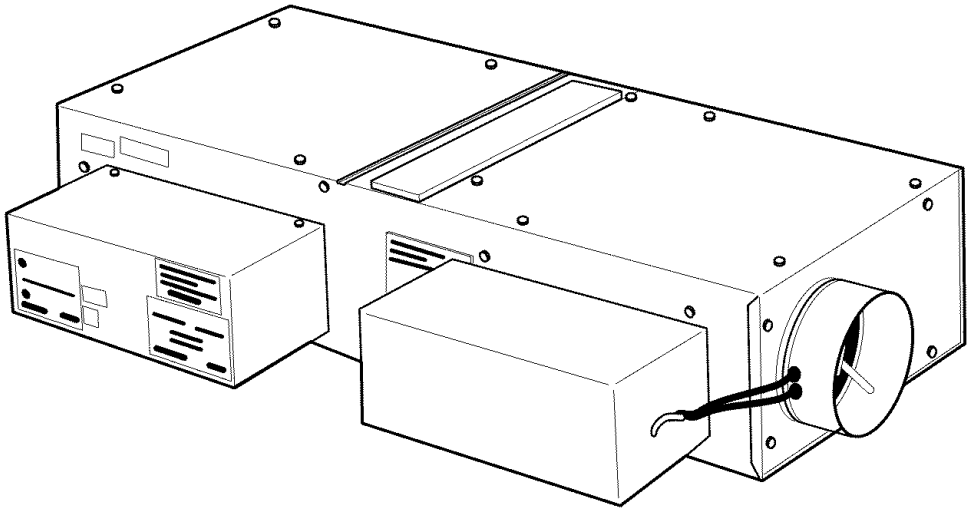
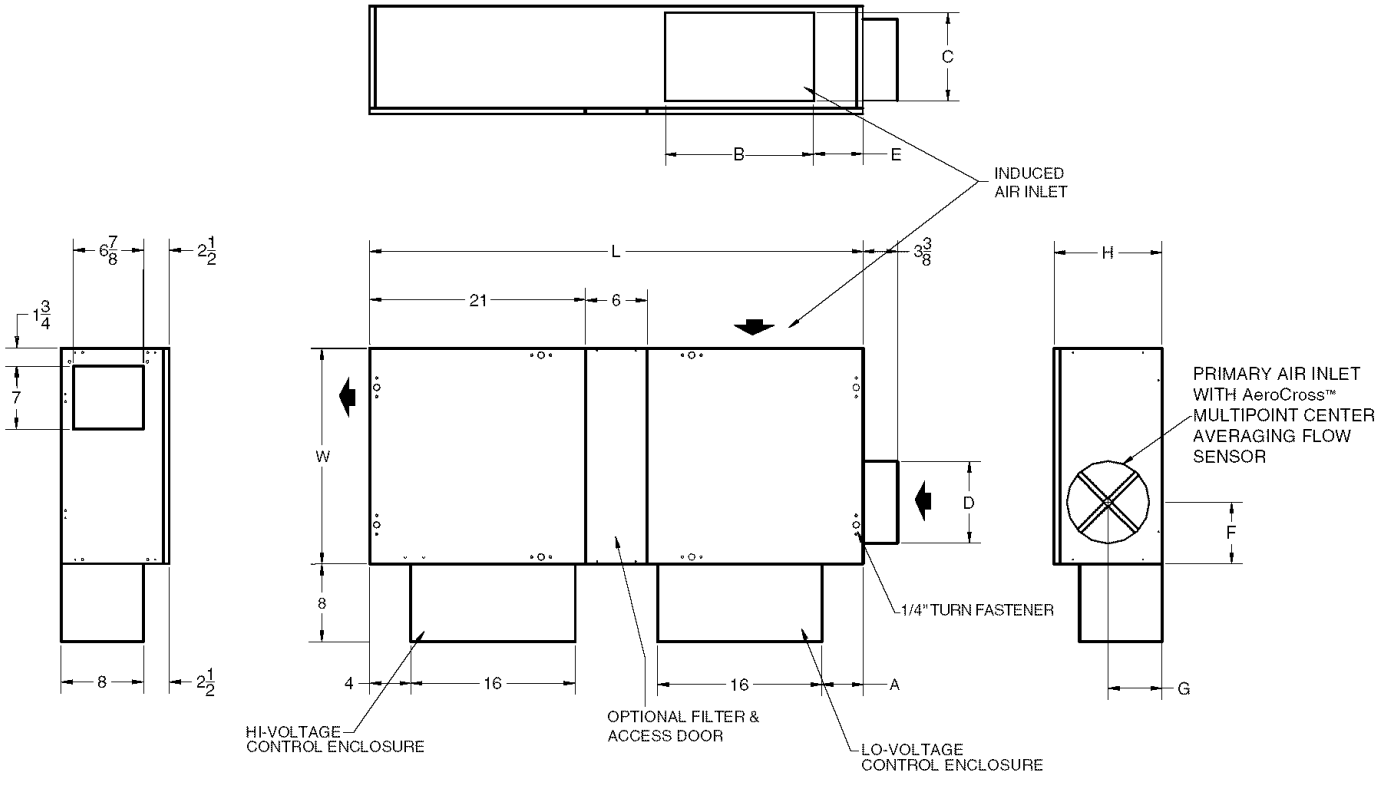


Fig. 32 — 45UC Series Fan-Powered Underfloor Unit Physical Detail



45UC UNIT SIZE	INLET SIZE (in.)	WEIGHT (lb)			
		Base Unit	With Hot Water Coil		With Electric Heat
			1-Row	2-Row	
3	9	120	132	136	150
4	9	128	140	146	158
	10	128	140	146	158

45UC UNIT SIZE	INLET SIZE	DIMENSIONS (in.)									
		A	B	C	D	E	F	G	H	L	W
3	9-in. Diameter	5	14	8	8 7/8	3 1/2	5 5/8	7	10 1/2	48	21
4	9-in. Diameter	5	14	12	8 7/8	3	5 5/8	7	14 1/8	48	21
	10-in. Diameter				9 7/8		6 5/8				

NOTE: All dimensions are in inches.

Fig. 33 — 45UC Underfloor Unit Physical Data and Dimensions

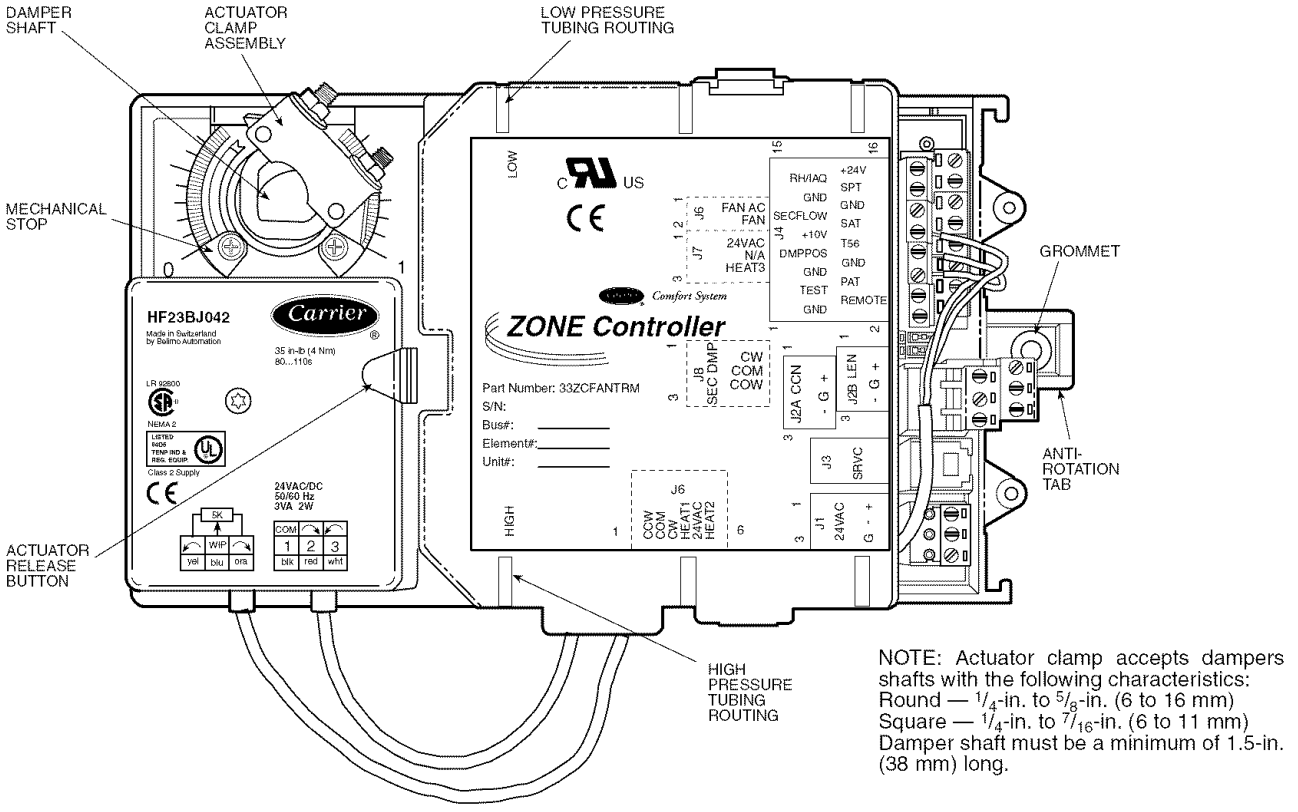


Fig. 34 — 45UC Underfloor Controller Physical Details (33ZCFANTRM)

45UC Underfloor Series Fan-Powered Unit Installation

STEP 1 — POSITION UNIT

1. Units should be installed under raised access flooring so that they do not come in contact with obstacles such as rigid conduit, sprinkler piping, Greenfield flexible metal covering, or rigid pneumatic tubing; such contact can transmit vibration to the building structure, causing objectionable low frequency noise.
2. Fan-powered terminals require sufficient clearance for servicing the blower/motor assembly, low voltage controls from the side and line voltage motor controls or electric heat (if equipped) from the rear (discharge end) of the unit.

   NOTE: Be certain that accommodations for panel removal of unit casings are large enough to allow adequate internal service room once the panels are removed.

   A clearance of 18 in. is recommended for control enclosure access. Unit control enclosure will vary depending on which control package is used. Control enclosure location is specified on unit submittals. Low voltage enclosure covers are removable, not hinged.

   A clearance of 36 in. is recommended for line voltage motor controls and electric heat control access. High voltage motor controls or electric heat control access is supplied with hinged access doors for units with fused disconnect. Specific location is indicated on the unit submittal.

   These recommendations do not supersede NEC (National Electrical Code) or local codes that may be applicable, which are the responsibility of the installing contractor.
3. When moving boxes, use appropriate material handling equipment and avoid contact with shaft extensions, controls, wiring, piping, heaters, and control boxes.
4. Raise unit to position using safe mechanical equipment and support until hanging means are attached and box is level.
5. If necessary, use furring strips to level the unit, and anchor units to floor.

STEP 2 — MAKE DUCT CONNECTIONS

1. Check that the air supply duct connections are airtight. Install supply ductwork on unit discharge, following all accepted medium-pressure duct installation procedures. Seal joints against leakage.

   NOTE: For maximum efficiency in controlling radiated noise in critical applications, inlet ducts should be fabricated of 24-gage minimum sheet metal in place of flex connections. Flex duct is extremely transparent to radiated sound; consequently high inlet static pressure (Ps) or sharp bends with excessive pressure drop can cause a radiated noise problem in the space. If flex duct is used, it should be limited to the connection between the distribution duct and the boot diffuser.
2. Install the discharge duct, being careful not to reduce the face area of any electric heat section until several diameters away from the unit. It is strongly recommended that lined discharge duct be used downstream of the unit. Insulate duct as required.
3. Fan boxes should not be attached to octopus sections immediately downstream of the unit.
4. Protect units from damage caused by jobsite debris. Do not allow foreign material to fall into unit. Prevent dust and debris from being deposited on motor or fan wheels.
5. Install optional return-air filters before operating the unit.
6. Leave construction filters supplied with the box in place until installation is complete and building is cleared for occupancy.

STEP 3 — POWER WIRING

⚠ WARNING

Disconnect electrical power before wiring or servicing the unit. All disconnect switches on the terminal (if equipped) should be in the OFF position while making power connections. Electrical shock, personal injury, or damage to the zone controller can result.

1. All power wiring must comply with local codes and with the NEC (National Electrical Code) ANSI/NFPA (American National Standards Institute/National Fire Protection Association) 70-1981. Disconnect switches are optional equipment. Electrical, control and piping diagrams are shown on the exterior labeling or on a diagram inside the control and high-voltage enclosure covers, unless otherwise specified in the order write-up. All units are wired for a single point electrical connection to the fan and electric heater (if equipped). Electric heaters provided by Carrier are balanced by kW per stage. The installing electrician should rotate incoming electric service by phase to help balance overall building load.
2. All field wiring must be provided with a safety disconnect per NEC 424-19, 20, and 21.
3. Units with electric heat should use copper wires rated at least 125% of rating plate amperage. Refer to the unit's rating label and minimum supply circuit amps.
4. Observe wiring diagram and instructions attached to the unit. A Wye power source with a fourth (neutral) wire in addition to the full sized ground wire is required for 480-v, 3-phase units. All units must be grounded as required by NEC 424-14 and 250. See Fig. 35-38.

45UC Sensor Installation — See Sensor Installation in 45XC Fan-Powered Zone Mixing Unit Installation.

Connect to the CCN Communication Bus — See Connect to the CCN Communication Bus section in 45XC Fan-Powered Zone Mixing Unit Installation.

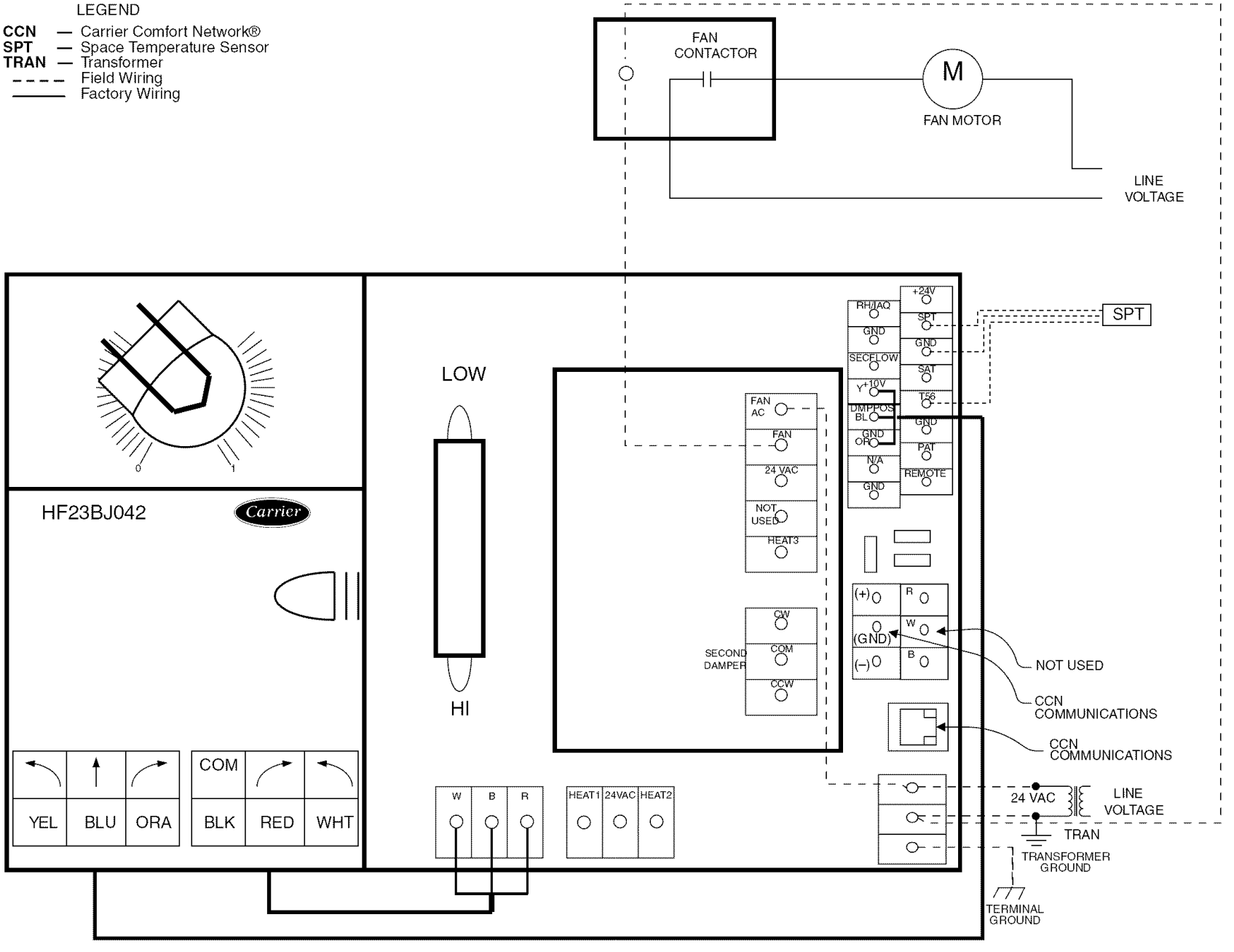


Fig. 35 — 45UC Underfloor Controller Wiring — Fan Powered Terminals, Cooling Only

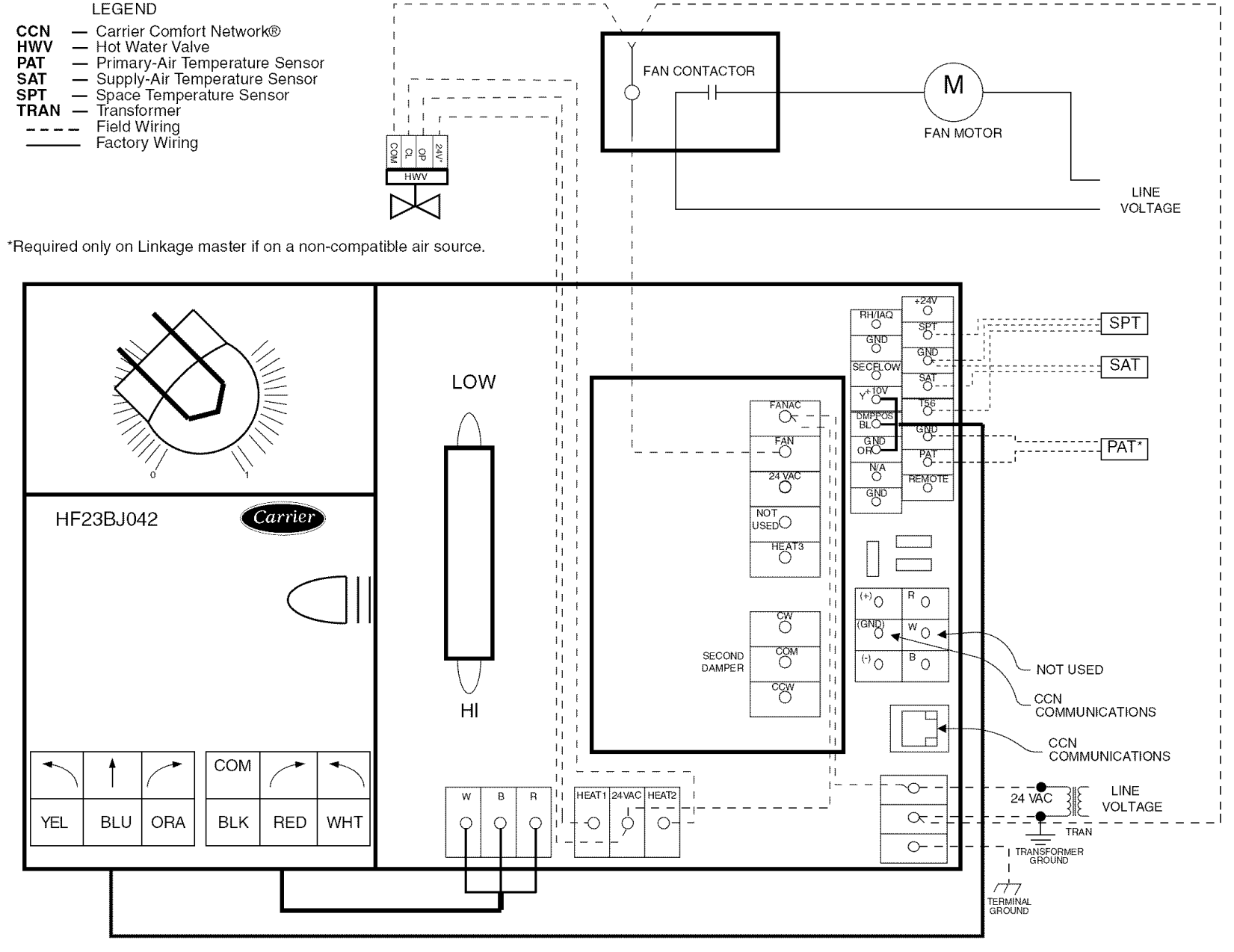
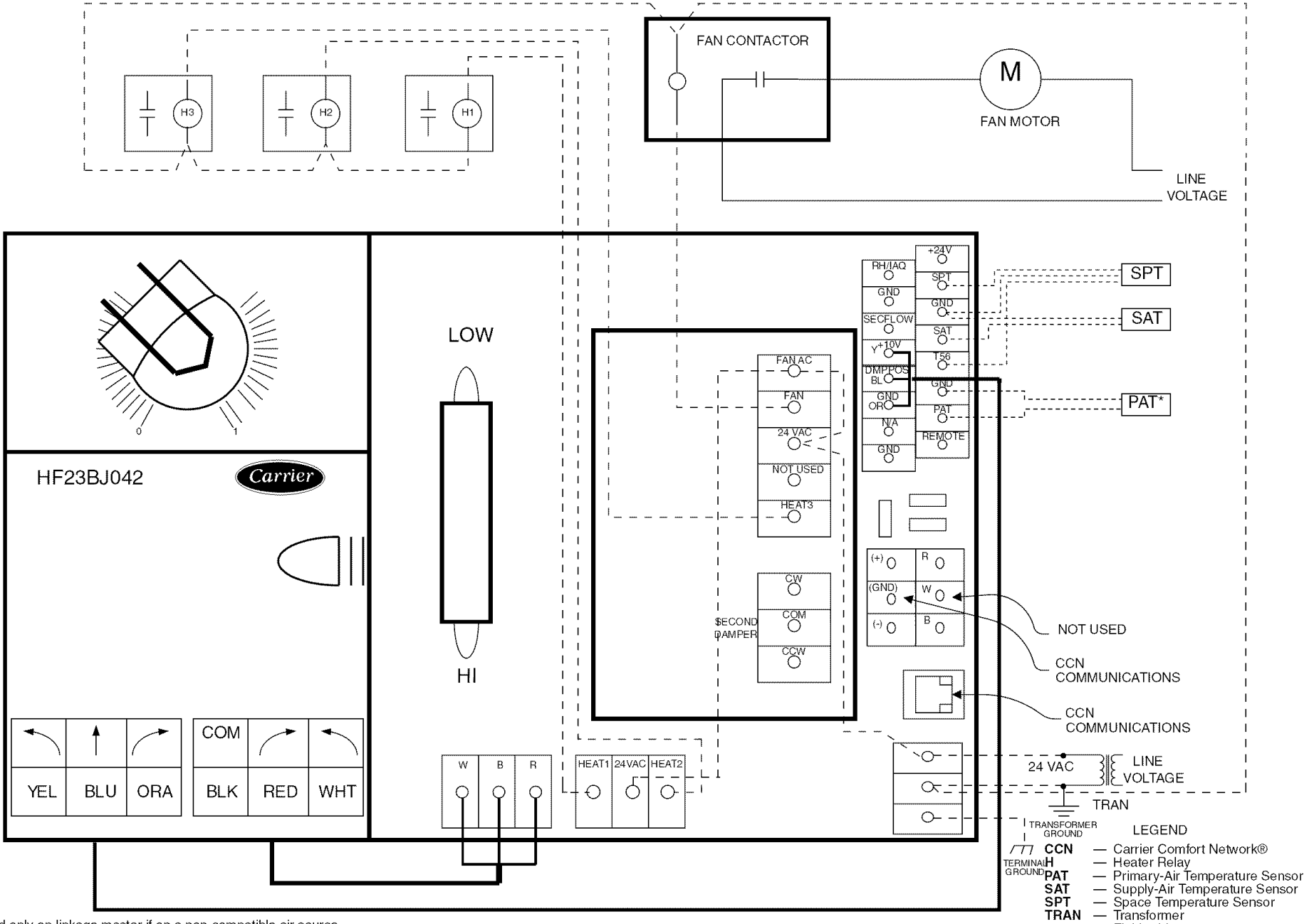


Fig. 36 — 45UC Underfloor Controller Wiring — Fan Powered Terminals, Modulating Hot Water Heat



*Required only on linkage master if on a non-compatible air source.

Fig. 37 — 45UC Underfloor Controller Wiring — Fan Powered Terminals, Staged Electric Heat

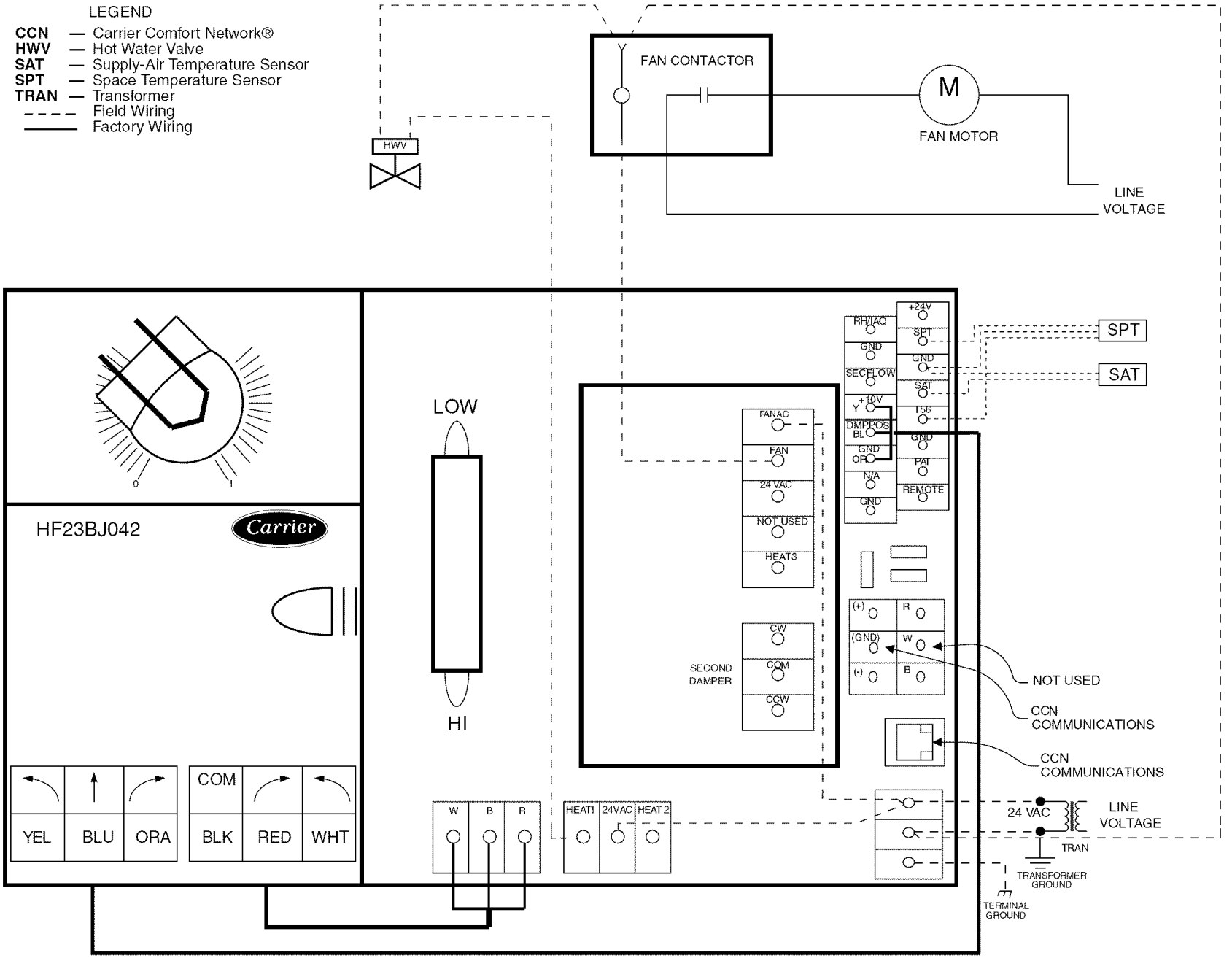


Fig. 38 — 45UC Underfloor Controller Wiring — Fan Powered Terminals, Two-Position Hot Water Heat

Modulating Baseboard Hydronic Heating —

Install the water valve on the leaving water end of the baseboard heater. See Fig. 39. Observe the fluid flow direction when mounting the valve. Be sure to properly heat sink the valve and direct the flame away from the actuator and valve body when sweating the valve connections. Install the leaving water temperature sensor (P/N 33ZCSENCHG) on the hydronic heating coil as shown. The sensor accommodates nominal copper pipe from $^1/_2$ to 1 in. (OD sizes from $^5/_8$ to $1^1/_8$ in.). It should be secured to the pipe with the clamp supplied. If piping is larger than 1 in. nominal size, a field-supplied clamp must be used. Use fiberglass pipe insulation to insulate the sensor assembly.

Refer to Fig. 36 to wire the modulating water valve and the sensor to the underfloor controller. Connect the leaving water temperature sensor to the controller using the wiring connections shown for the SAT sensor.

NOTE: The leaving water temperature sensor replaces the SAT sensor in this application.

Use 18 or 20 AWG wire for all connections. The water valve actuator housing may be used as a junction box if the leaving water temperature sensor cable is not long enough and the sensor cable must be extended to reach the controller.

For modulating hydronic heating applications, the default configuration must be changed to properly control the valve. Refer to the service configuration table and set the Heating Loop parameters as follows:

Proportional Gain = 20.0
Integral Gain = 0.5
Derivative Gain = 0.0
Start Value = 102.0

Also, set the Ducted Heat decision to YES and set the Maximum Duct Temperature decision equal to 200 F.

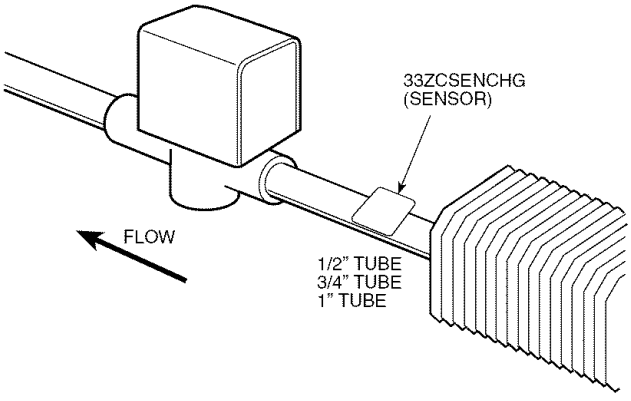


Fig. 39 — Typical Water Valve and Sensor Installation

42KC PERIMETER FAN COIL UNIT INSTALLATION

Physical components of the 42KC fan coil unit is detailed in Fig. 40. Refer to Fig. 41 for 42KC fan coil unit details.

42KC Hardware — The 42KC perimeter fan coil unit contains the 33ZCFANCOL zone controller.

Figure 42 shows the 42KC perimeter fan coil controller physical details.

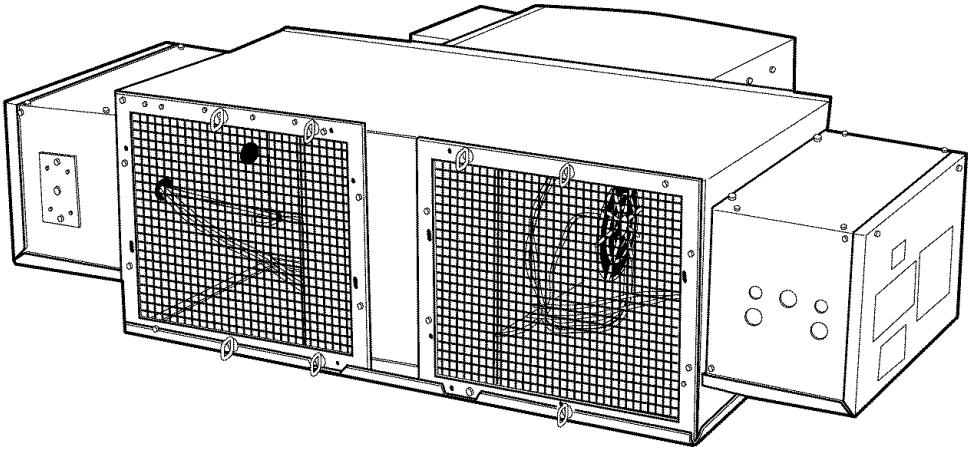
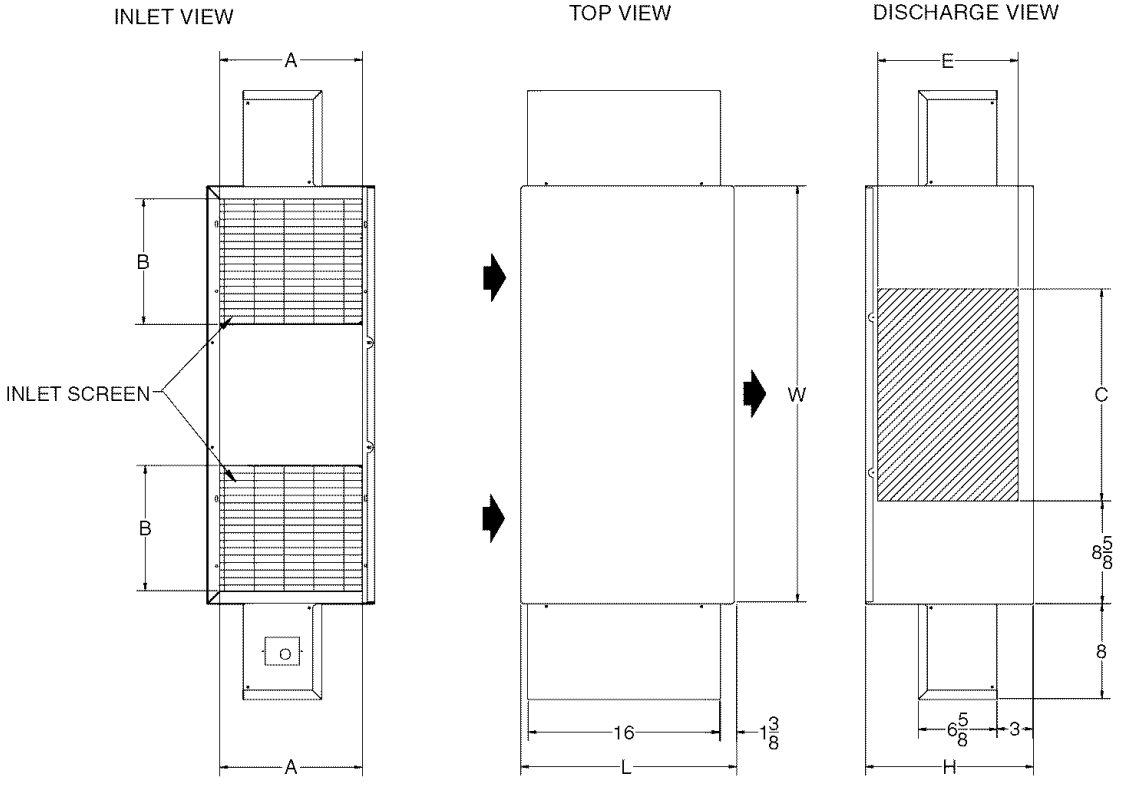


Fig. 40 — 42KC Fan Coil Unit Physical Details



NOTE: All dimensions are in inches.

42KC UNIT SIZE	INLET SIZE (in.)	WEIGHT (lb)			
		Base Unit	With Hot Water Coil		With Electric Heat
			1-Row	2-Row	
14	12 x 10 1/2	120	132	136	150
16	14 x 9 7/8	128	140	146	158

42KC UNIT SIZE	DIMENSIONS (in.)						
	A	B	C	E	H	L	W
14	12	10 1/2	17 3/4	11 3/4	14	18	34 7/8
16	14	9 7/8	17 3/4	13 3/4	16	19	34 7/8

Fig. 41 — 42KC Fan Coil Unit Physical Data and Dimensions

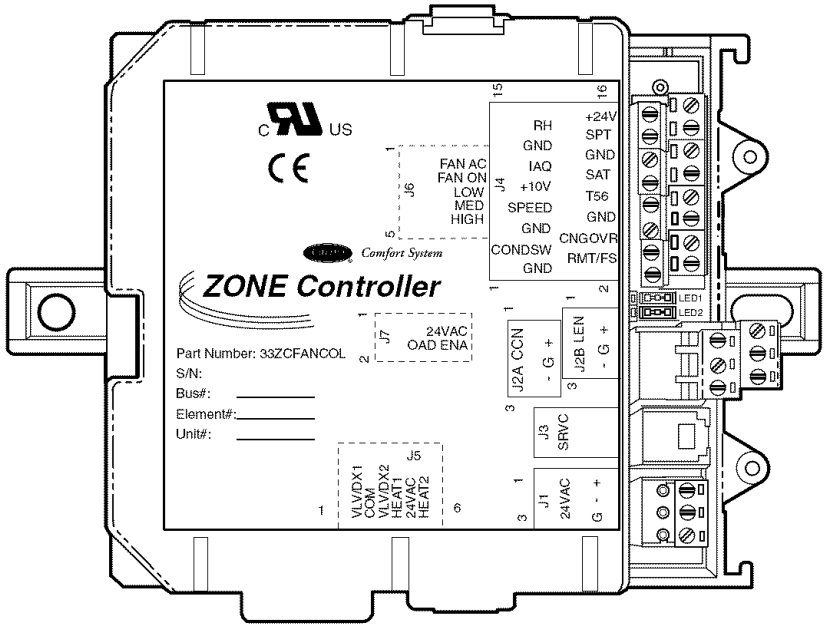


Fig. 42 — 42KC Perimeter Fan Coil Controller Physical Details (33ZCFANCOL)

42KC Field-Supplied Hardware — Each 42KC perimeter fan coil unit requires the following field-supplied components to complete its installation:

- transformer — 24 vac, 40 va (standard applications)
- contactors (as required for fan or electric heat)
- space temperature sensor (33ZCT55SPT, 33ZCT56SPT, or 33ZCT57SPT)
- supply-air temperature sensor (33ZCSENSAT) with two no. 10 x $^1/_2$-in. sheet metal screws (to secure SAT sensor to supply duct)
- changeover sensor (required for 2-pipe applications)
- indoor-air quality (CO_2) sensor (optional)
- linkage thermostat (optional)
- relative humidity sensor (optional)
- valve and actuator for hot water heat (optional)

SPACE TEMPERATURE SENSOR — Each zone controller requires a field-supplied Carrier space temperature sensor. There are four standard temperature sensors available for this application:

- 33ZCT55SPT, space temperature sensor with override button
- 33ZCT56SPT, space temperature sensor with override button and set point adjustment
- 33ZCT57SPT, space temperature sensor with override button, set point adjustment, and manual fan speed control
- 33ZC58SPT, space temperature sensor with override button, set point adjustment, and fan speed control, and LCD display

SUPPLY-AIR TEMPERATURE (SAT) SENSOR — The zone controller must be connected to a field-supplied supply-air temperature (SAT) sensor (P/N 33ZCSENSAT) to monitor the temperature of the air delivered by the fan coil.

CHANGEOVER SENSOR — The 33ZCSENCHG changeover sensor is used by the 42KC zone controller in 2-pipe applications to determine the temperature of the medium which is supplied to the fan coil by the building piping system. The controller can then determine if it is capable of providing heating or cooling to the space based on sensing the pipe water temperature. This value may be broadcast to other fan coils if a linkage thermostat is used or the controller is part of a CCN system with a comfort controller.

INDOOR-AIR QUALITY (CO_2) SENSOR — An indoor-air quality sensor is required for indoor air quality monitoring. Three different CO_2 sensors are available for zone CO_2 level monitoring. One is used to measure CO_2 only, while two other models combine the CO_2 sensor with a space temperature sensor to eliminate the need for multiple sensors in each zone.

- The 33ZCSENCO2 sensor is an indoor, wall-mounted sensor with an LED (light-emitting diode) display.
- The 33ZCT55CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button.
- The 33ZCT56CO2 sensor is an indoor, wall-mounted sensor without display. The CO_2 sensor also includes a space temperature sensor with override button and temperature offset.

LINKAGE THERMOSTAT — The linkage thermostat (33CSKITLST-01) can be used to control multiple 42KC units from a single thermostat. The linkage thermostat provides thermostat functions for up to 8 units serving a common zone. Thermostat functions include space temperature sensing, remote set point adjustment, and occupancy information. The linkage thermostat can be used in place of any space temperature sensor.

RELATIVE HUMIDITY — The relative humidity sensor (P/N 33AMSENRHS000) is an indoor, wall-mounted sensor and is required for zone humidity control (dehumidification).

42KC Perimeter Fan Coil Unit Installation

STEP 1 — POSITION UNIT

1. Units should be installed under raised access flooring so that they do not come in contact with obstacles such as rigid conduit, sprinkler piping, Greenfield flexible metal covering, or rigid pneumatic tubing; such contact can transmit vibration to the building structure, causing objectionable low frequency noise.
2. Fan-powered terminals require sufficient clearance for servicing the blower/motor assembly, low voltage controls from the side and line voltage motor controls or electric heat, if equipped, from the rear (discharge end) of the unit. See Fig. 43.

   NOTE: Be certain that accommodations for panel removal of unit casings are large enough to allow adequate internal service room once the panels are removed.

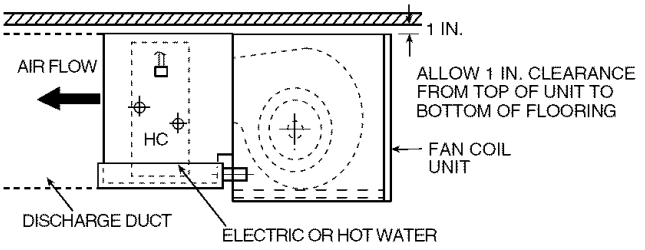


Fig. 43 — Service Clearance for Fan Coil Unit Installation

A clearance of 18 in. is recommended for control enclosure access. Unit control enclosure will vary depending on which control package is used. Control enclosure location is specified on unit submittals. Low voltage enclosure covers are removable, not hinged.

A clearance of 36 in. is recommended for line voltage motor controls and electric heat control access. High voltage motor controls or electric heat control access is supplied with hinged access doors for units with fused disconnect. Specific location is indicated on the unit submittal.

These recommendations do not supersede NEC (National Electrical Code) or local codes that may be applicable, which are the responsibility of the installing contractor.

3. When moving boxes, use appropriate material handling equipment and avoid contact with shaft extensions, controls, wiring, piping, heaters, and control boxes.
4. Raise unit to position using safe mechanical equipment and support until hanging means are attached and box is level.

STEP 2 — INSTALL UNIT — If necessary, use furring strips to level the unit, and anchor units to floor.

STEP 3 — MAKE DUCT CONNECTIONS

1. Check that the air supply duct connections are airtight. Install supply ductwork on unit discharge, following all accepted medium-pressure duct installation procedures. Seal joints against leakage.

   NOTE: For maximum efficiency in controlling radiated noise in critical applications, inlet ducts should be fabricated of 24-gage minimum sheet metal in place of flex connections. Flex duct is extremely transparent to radiated sound; consequently, high inlet static pressure (Ps) or sharp bends with excessive pressure drop can cause a radiated noise problem in the space. If flex duct is used, it should be limited to the connection between the distribution duct and the boot diffuser.
2. Install the discharge duct, being careful not to reduce the face area of any electric heat section until several diameters away from the unit. It is strongly recommended that lined discharge duct be used downstream of the unit. Insulate duct as required.
3. Fan boxes should not be attached to octopus sections immediately downstream of the unit.
4. Protect units from damage caused by jobsite debris. Do not allow foreign material to fall into unit. Prevent dust and debris from being deposited on motor or fan wheels.
5. Install optional return-air filters before operating the unit.
6. Leave construction filters supplied with the box in place until installation is complete and building is cleared for occupancy.

STEP 4 — POWER WIRING

⚠ WARNING

Disconnect electrical power before wiring or servicing the unit. All disconnect switches on the terminal (if equipped) should be in the OFF position while making power connections. Electrical shock, personal injury, or damage to the zone controller can result.

1. All power wiring must comply with local codes and with the NEC ANSI/NFPA (American National Standards Institute/National Fire Protection Association) 70-1981. Disconnect switches are optional equipment. Electrical, control and piping diagrams are shown on the exterior labeling or on a diagram inside the control and high-voltage enclosure covers, unless otherwise specified in the order write-up. All units are wired for a single point electrical connection to the fan and electric heater (if equipped). Electric heaters provided by Carrier are balanced by kW per stage. The installing electrician should rotate incoming electric service by phase to help balance overall building load.
2. All field wiring must be provided with a safety disconnect per NEC 424-19, 20, and 21.
3. Units with electric heat should use copper wires rated at least 125% of rating plate amperage. Refer to the unit's rating label and minimum supply circuit amps.
4. Observe wiring diagram and instructions attached to the unit. A Wye power source with a fourth (neutral) wire, in addition to the full-sized ground wire, is required for 480-v, 3-phase units. All units must be grounded as required by NEC 424-14 and 250.

Connect the Power Transformer — An individual, field-supplied, 24 vac power transformer is required for each zone controller. Transformers must be UL Class 2 rated. Standard applications require a 24 vac transformer, rated at 40 va minimum. All transformer secondaries are required to be grounded. Use only stranded copper conductors for all wiring to the zone controller. Wiring connections must be made in accordance with NEC and local codes. Ground one side of the transformer secondary at the transformer location. Connect the grounded side of the transformer to J1-2. Connect the hot side of the transformer secondary to J1-1. Connect an 18-gage, green ground wire from terminal J1-3 to the metal chassis of the unit.

For zone controllers, the power requirement sizing allows for a water valves accessory and for the fan contactor. Water valves are limited to 10 va on both two-position and modulating hot water. The fan contactor is limited to 3 va (holding) for each fan output.

NOTE: If a water valve contactor exceeds these limits, or external contactors are required for electric heat, then it is recommended that a 60 va transformer be used. The maximum rating for any single output is 20 va.

NOTE: Do not run sensor or communication wiring in the same conduit with line-voltage wiring.

NOTE: An accessory conduit box (P/N 33ZCCONBOX) is available for conduit wiring connections to the zone controller.

Perform the following steps to connect the power transformer:

1. Install the field-supplied transformer in an electrical enclosure that conforms to NEC and local codes.
2. Connect 24 vac from the transformer as shown in the applicable wiring diagram (Fig. 44-48). Be sure to observe polarity when connecting the transformer power.

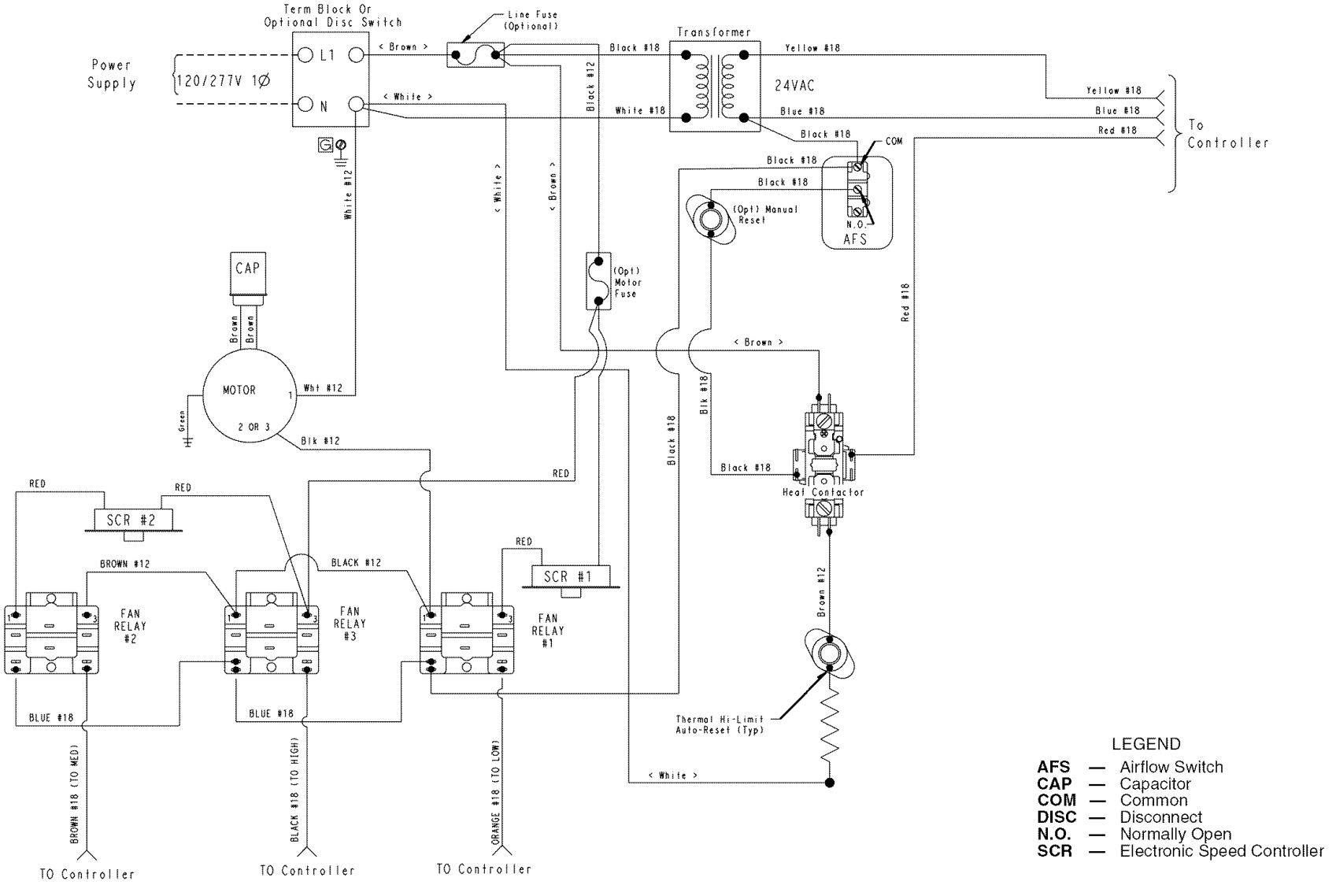


Fig. 44 — Typical 42KC 115/277 V, Single-Phase, 1-Stage, 1-Element Wiring Diagrams for Fan-Powered Units with Electric Heat

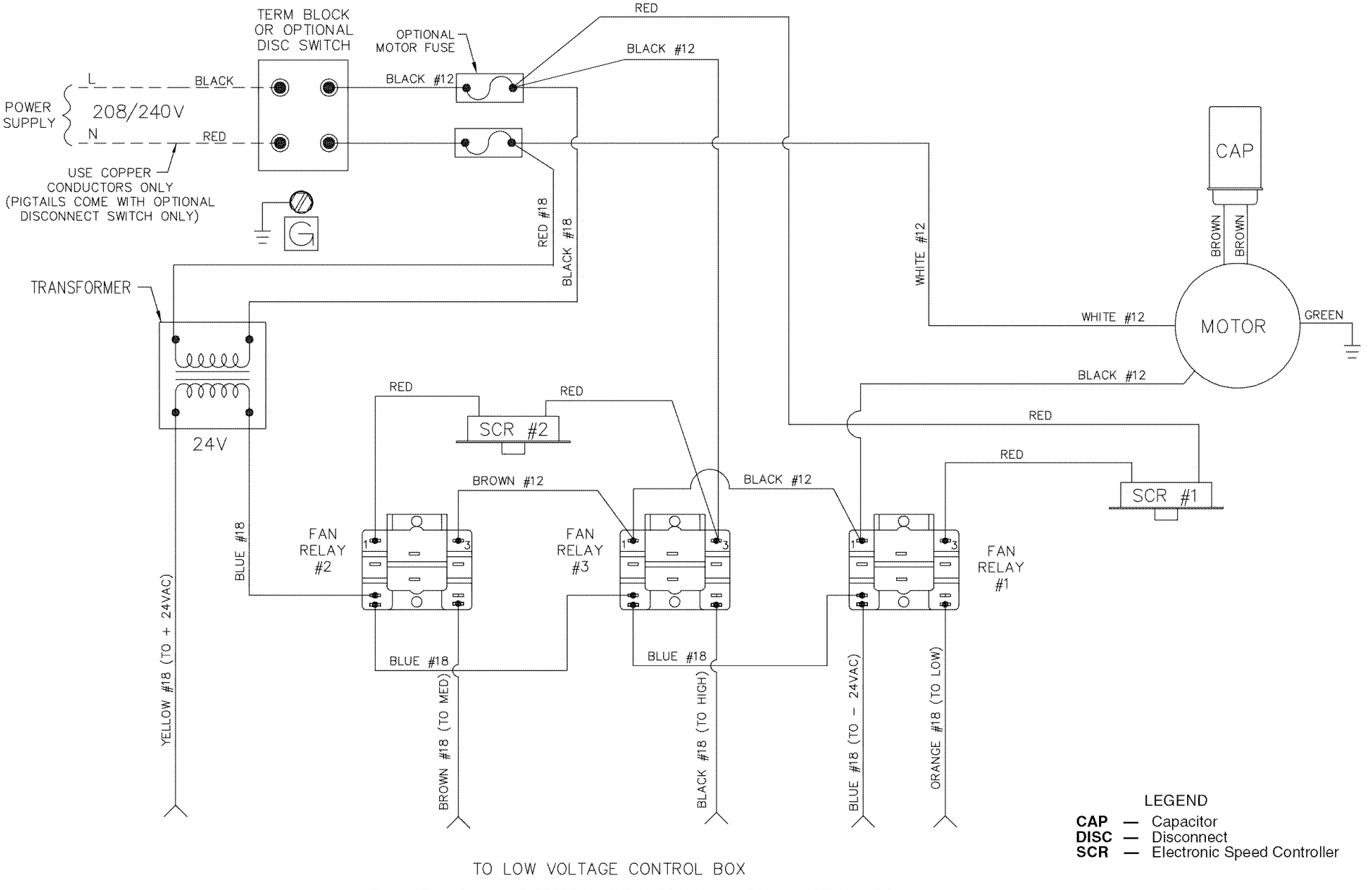


Fig. 45 — Typical 42KC 208/240 V, Single-Phase Wiring Diagrams for Fan-Powered Units Without Electric Heat

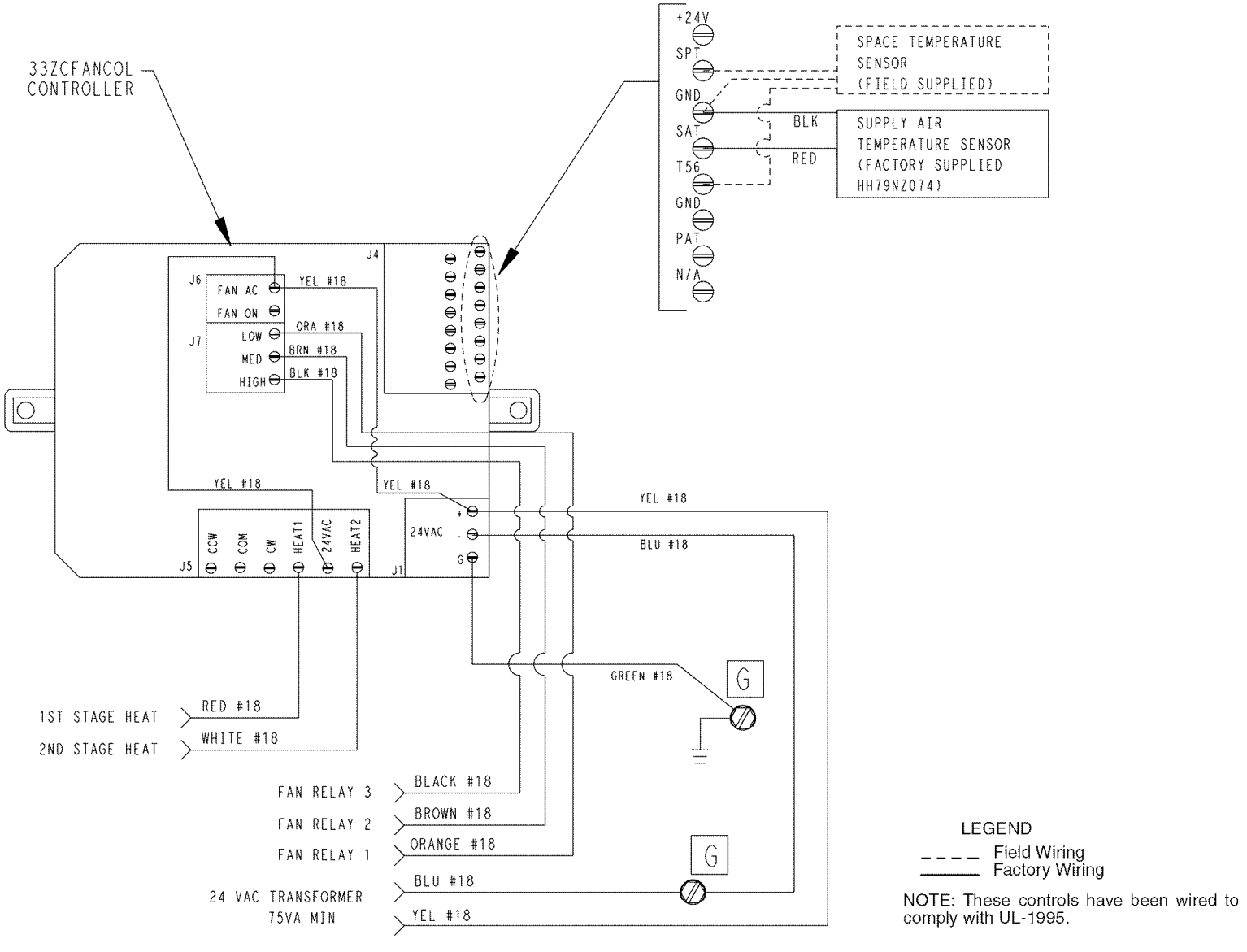


Fig. 46 — Typical Low Voltage Control Wiring Diagram for 42KC Fan-Powered Units with Up to 2 Stages of Electric Heat

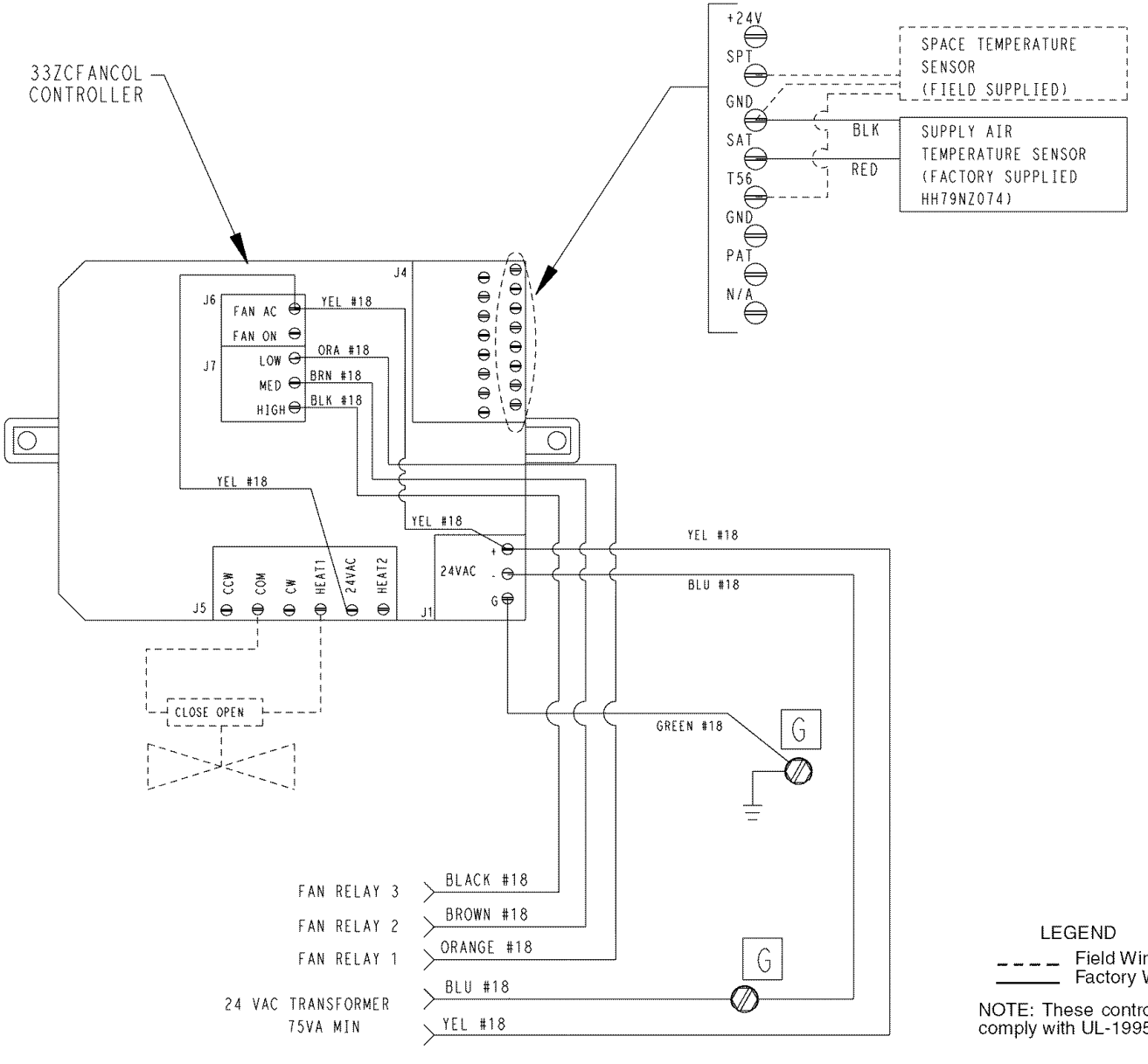


Fig. 47 — Typical Low Voltage Control Wiring Diagram for 42KC Fan-Powered Units with On/Off Hot Water Heat

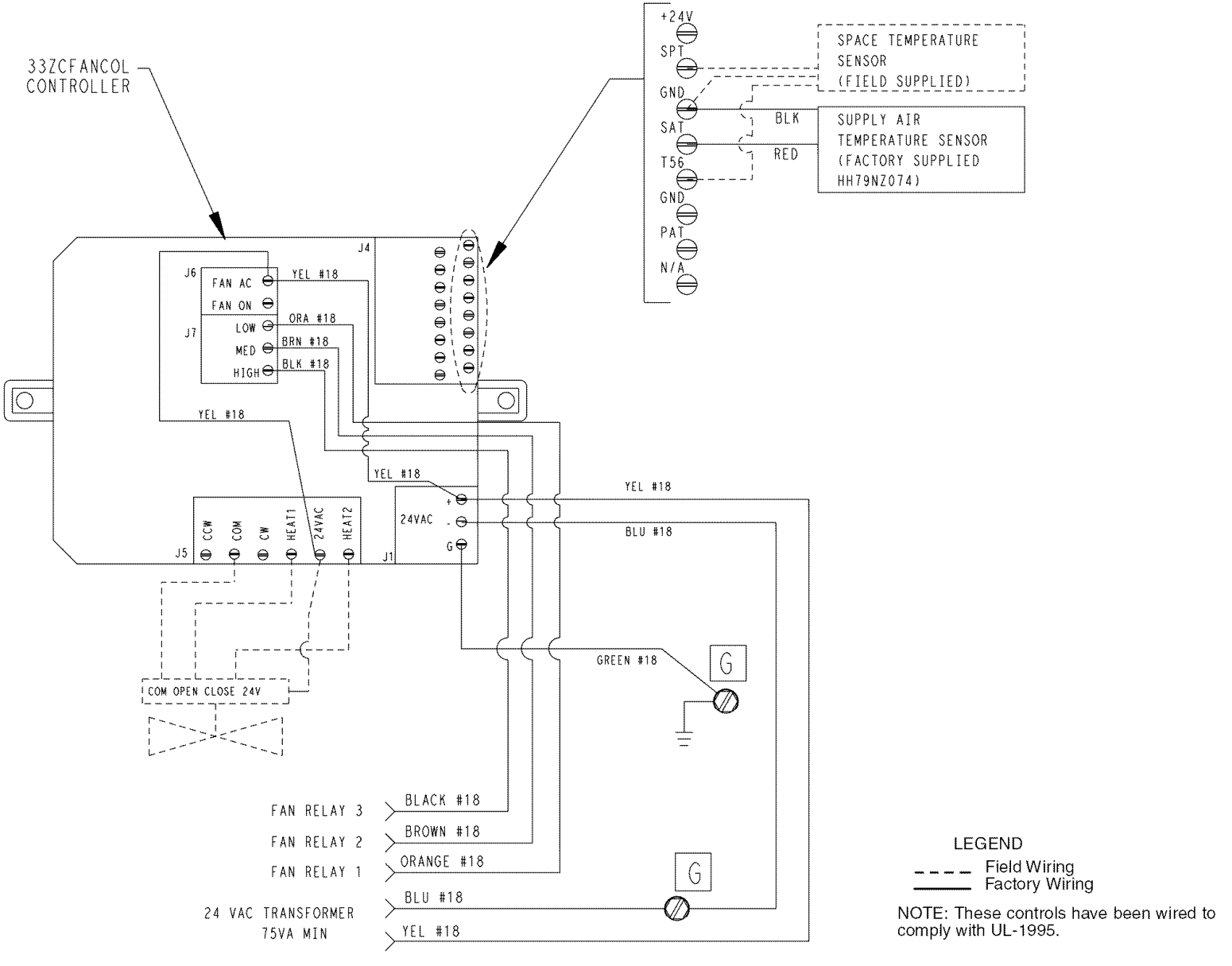


Fig. 48 — Typical Low Voltage Control Wiring Diagram for 42KC Fan-Powered Units with 3-Point Floating Valve

Fan Coil Controller Inputs and Outputs — The fan coil controller inputs and outputs are shown in Fig. 49 and 50.

CONNECT ACCESSORIES — Refer to accessory installation instructions for installation procedures. Fan coil controller wiring is shown for the linkage thermostat, which is an optional accessory (Fig. 51).

42KC Sensor Installation — See 45XC Sensor Installation section on page 14.

Inputs (J4)

CHANNEL	J4 PINS (+,–)	DESCRIPTION	CONTROL DEVICE
SPT	14, 12	Space Temperature	10K Thermistor
SAT	10, 12	Supply Air Temperature	10K Thermistor
SP_OFFSET (T56/T57)	8, 12	Set Point Offset Adjust	100K Potentiometer
CNGOVR	4, 6	Changeover Sensor	10K Thermistor
RH	16 (24 VDC), 15 (+), 13 (–)	RH Sensor	2-10 VDC
SPEED	7 (+), 5 (–)	Manual Speed Position	0-10 VDC
IAQ	11 (+), 13 (–)	Indoor Air Quality Sensor	0-10 VDC
FS OR REMOTE S/S	2 (24 VDC), J1 Pin 1 (Gnd)	Fan Status or Remote Start/Stop	24 VAC (DI)

LEGEND

DI — Direct Input
FS — Fan Status
IAQ — Indoor Air Quality
RH — Relative Humidity
SAT — Supply-Air Temperature
SPT — Space Temperature
S/S — Start/Stop

NOTES:
1. Terminals 1 and 3 provide switched 24 VAC output power to the load.
2. Terminal 5 connects to field-supplied 24 vac.
3. The 24 v connection (J4-16) is required for RH sensor only.

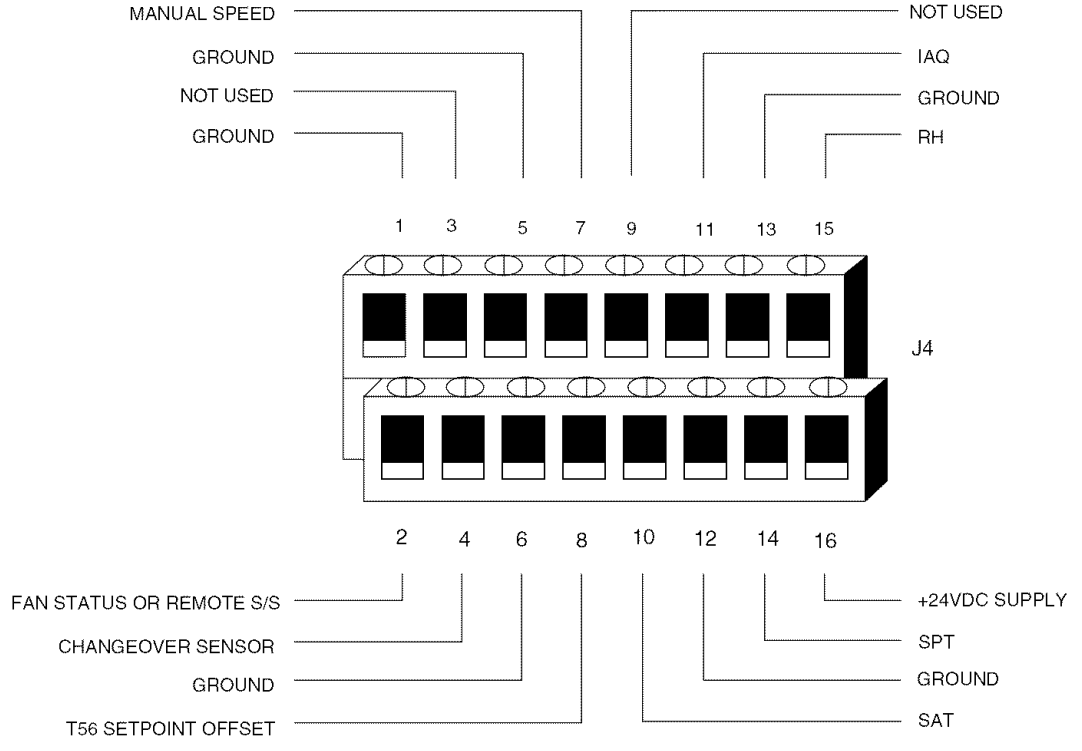


Fig. 49 — 42KC Fan Coil Controller Inputs

Daughter Board Outputs (J6, J7)

CHANNEL	TERMINATIONS(+,–)	DESCRIPTION	CONTROL DEVICE
FAN AC	J6-1, J1-1	Fan Input Power	24V, 5A
FAN ON	J6-2, J1-2	Fan Start/Stop*	24V, 5A
LOW	J6-3, J1-2	Low Speed	24V, 5A
MED	J6-4, J1-2	Med Speed	24V, 5A
HI	J6-5, J1-2	High Speed	24V, 5A
OAD	J7-1, J7-2	Outdoor Air Damper	24 VAC 1A

*For single-speed fan units, connect fan start/stop to control fan contactor.
NOTE: J6-1 must be jumpered to 24 VAC +. (J1-1).

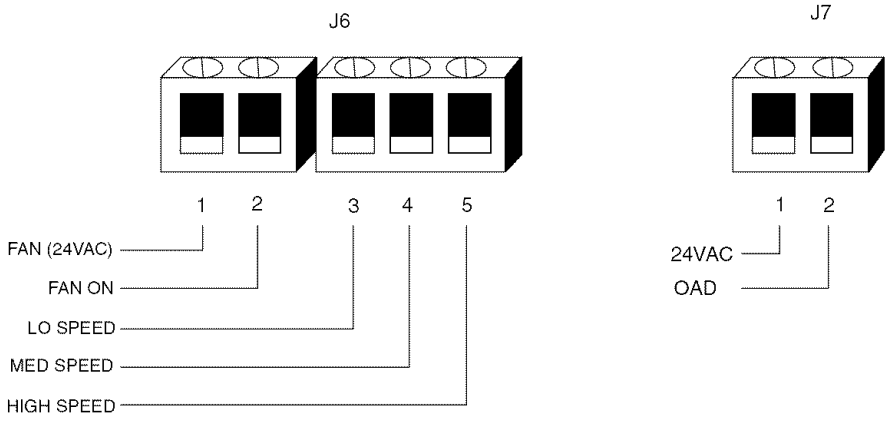


Fig. 50 — 42KC Fan Coil Controller Daughter Board Outputs

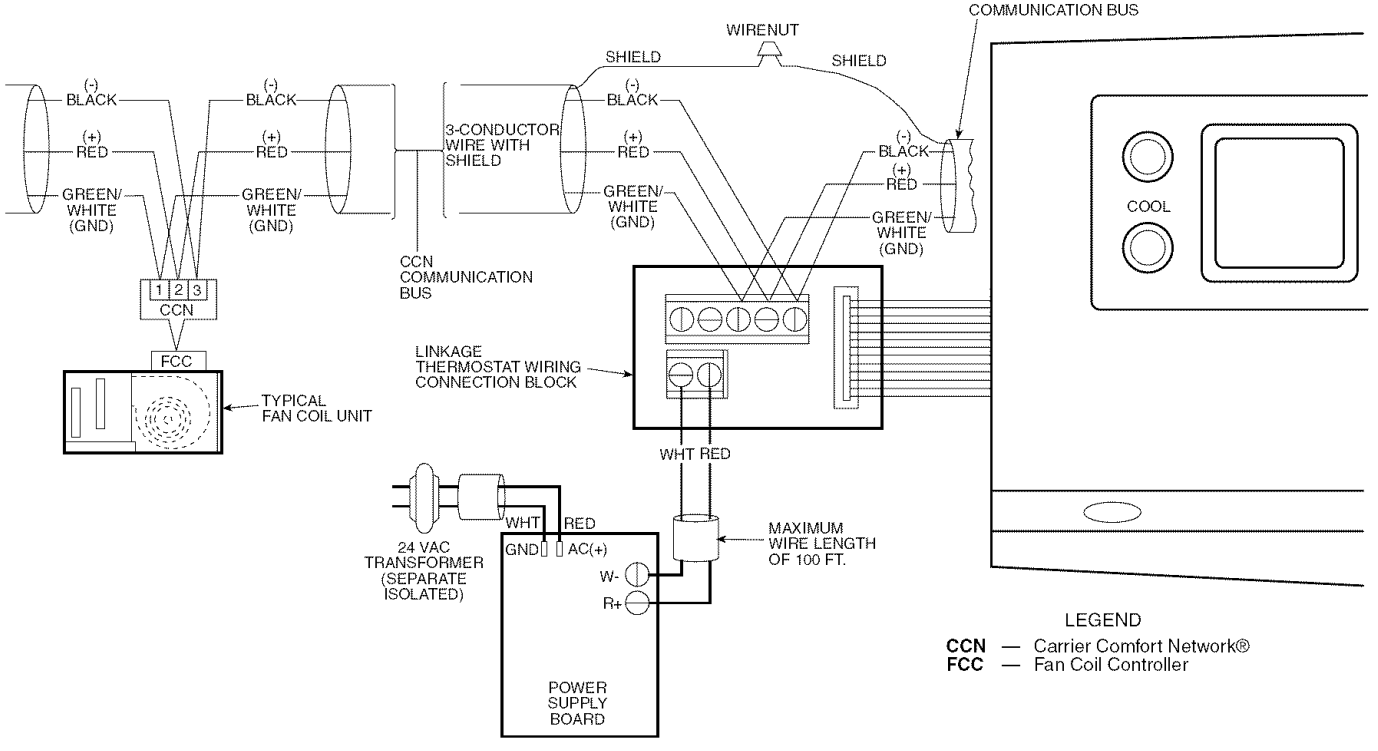


Fig. 51 — 42KC Wiring Connections (Linkage Thermostat Option)

35BF DIFFUSER INSTALLATION

35BF-R Swirl Diffuser Installation — Hole openings for diffusers are pre-cut in the floor panels at the factory. Removal of flooring is not necessary to install the diffusers.

Install diffusers after flooring and carpet installation is complete through the top panel by placing the unit into the gasketed positive compression quick mount underfloor ring.

Secure the gasketed quick mount underfloor ring to the trim ring on the underside of the raised panel. See Fig. 52.

35BF-CT, D, V Linear Diffuser Installation — Removal of flooring is not necessary to install the 35BF-D linear floor diffuser plenum and 35BF-V variable volume diffuser plenum with damper; they can be installed into raised flooring from the top surface. See Fig. 53 and 54.

The 35BF-CT rectangular floor grilles/diffuser frame may be used with either of the linear floor diffusers. See Fig. 55 for dimension and deflection information.

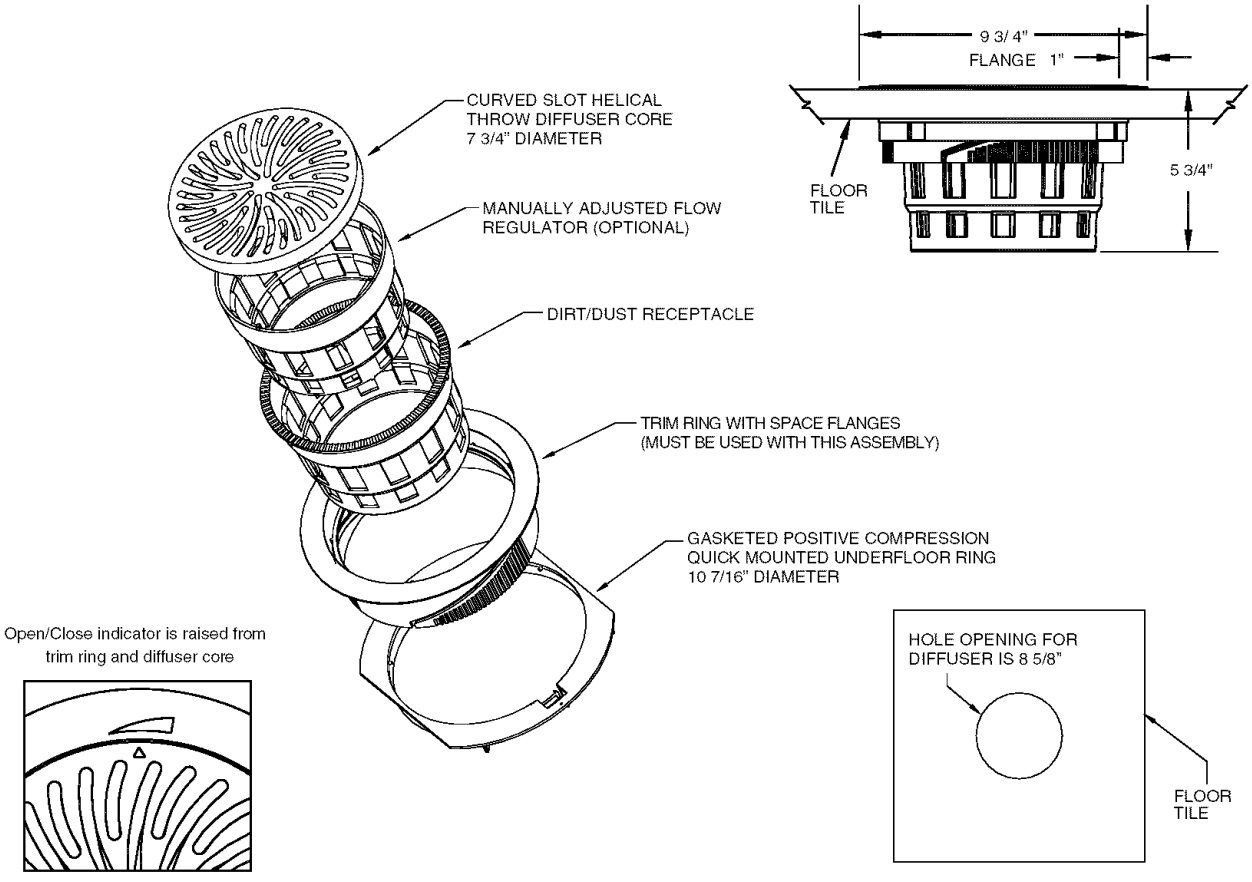

9 3/4"
FLANGE 1"
5 3/4"
FLOOR TILE
CURVED SLOT HELICAL THROW DIFFUSER CORE 7 3/4" DIAMETER
MANUALLY ADJUSTED FLOW REGULATOR (OPTIONAL)
DIRT/DUST RECEPTACLE
TRIM RING WITH SPACE FLANGES (MUST BE USED WITH THIS ASSEMBLY)
GASKETED POSITIVE COMPRESSION QUICK MOUNTED UNDERFLOOR RING 10 7/16" DIAMETER
Open/Close indicator is raised from trim ring and diffuser core
HOLE OPENING FOR DIFFUSER IS 8 5/8"
FLOOR TILE

Fig. 52 — 35BF-R Adjustable Swirl Diffuser

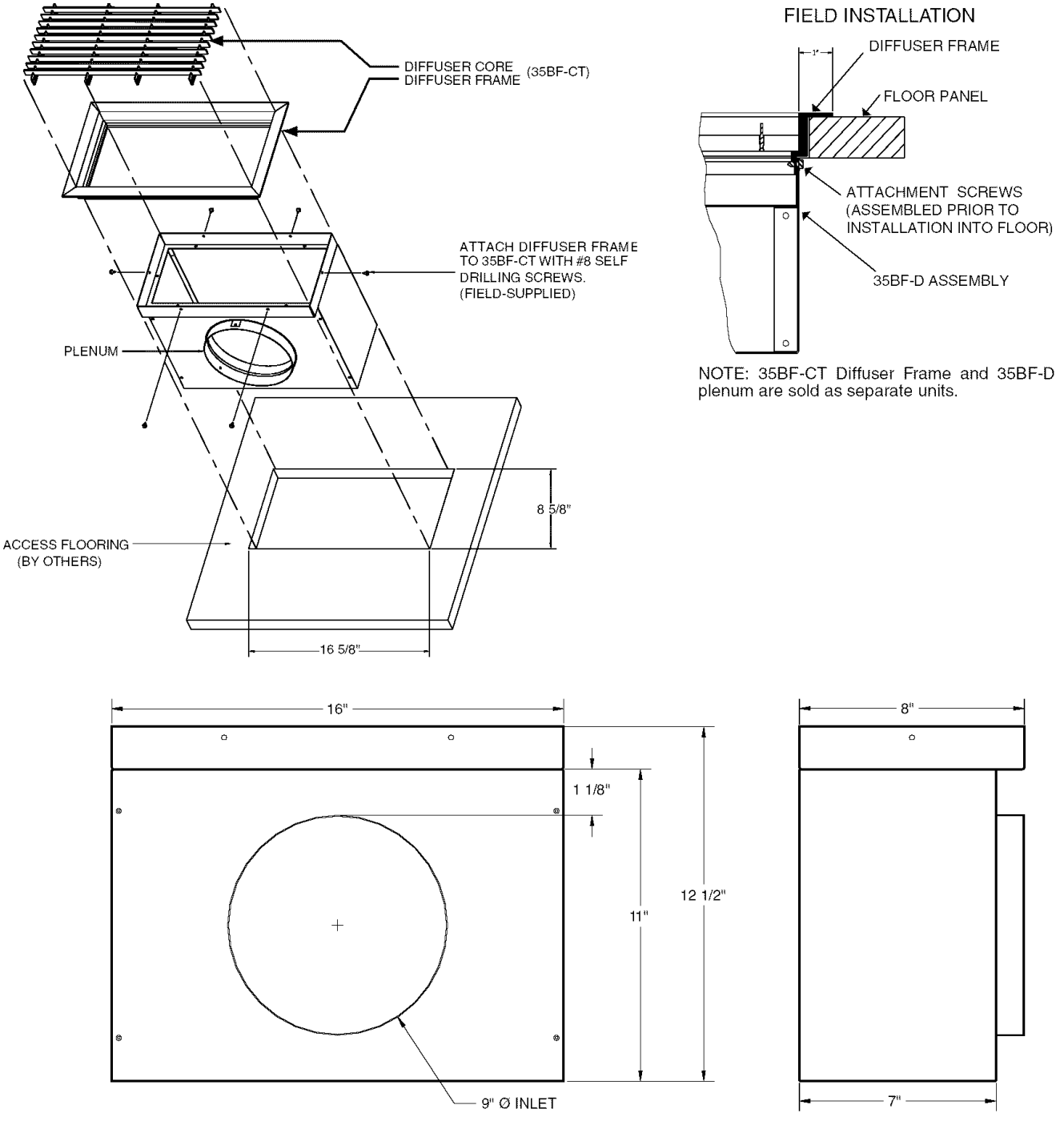


Fig. 53 — 35BF-D Linear Floor Diffuser Plenum

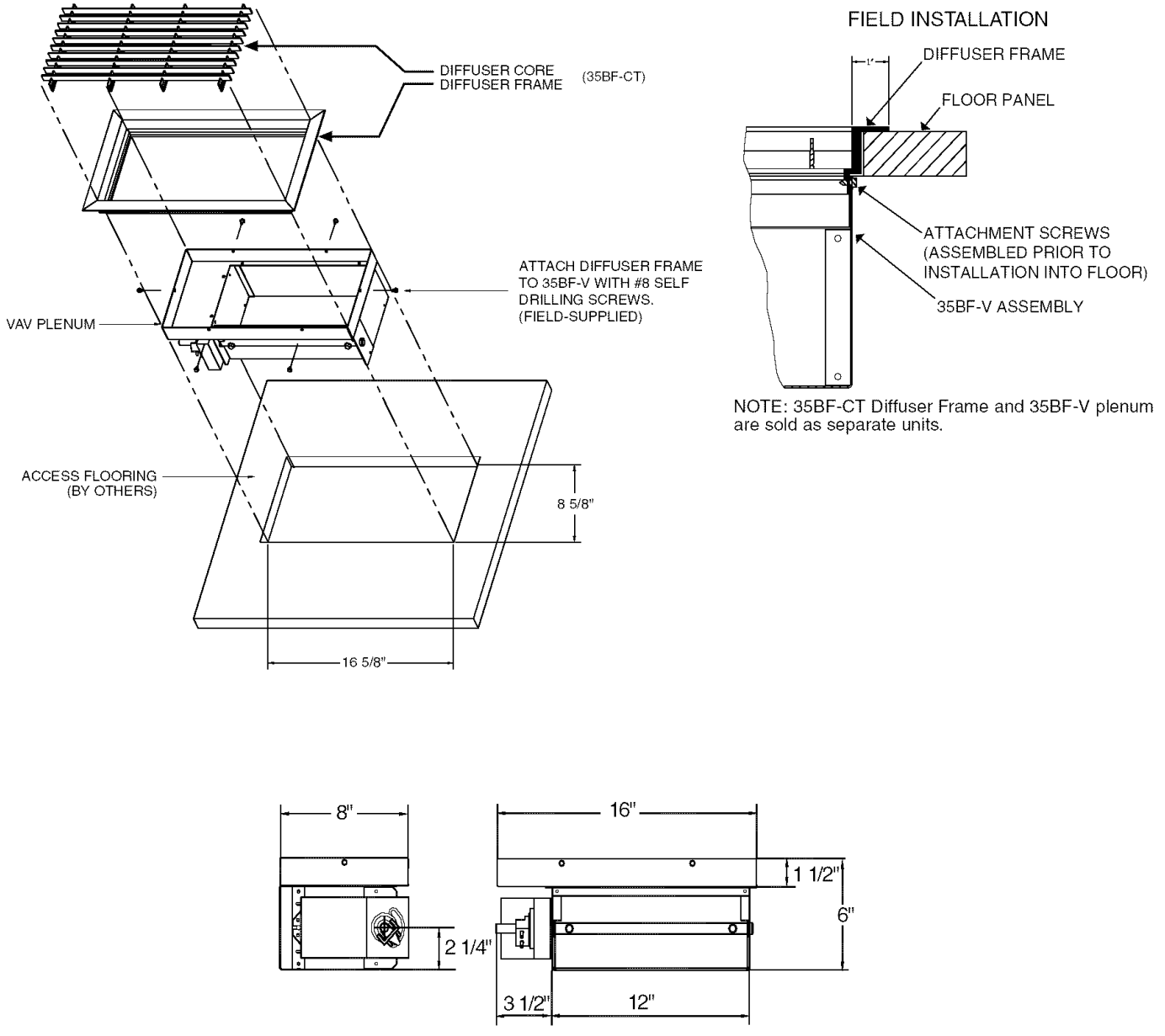
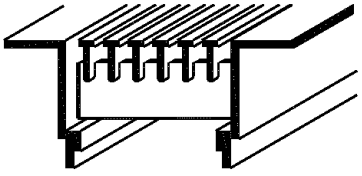


Fig. 54 — 35BF-V Variable Volume Diffuser Plenum

35BF-CT ALUMINUM — FIXED BARS

CT-480 — 1/4-in. SPACING, 1/8-in. BARS, 0° DEFLECTION
CT-481 — 1/4-in. SPACING, 1/8-in. BARS, 15° DEFLECTION

CORE WITH HEAVY DUTY MOUNTING FRAME FOR FLOOR APPLICATIONS

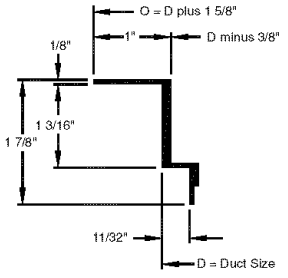


Type 5 heavy duty mounting frame is shown.
NOTE: Core is furnished with additional reinforcing.

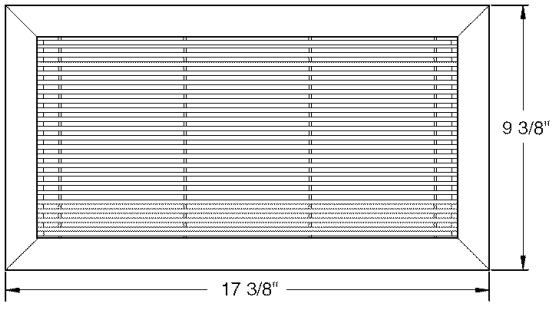
HEAVY DUTY MOUNTING FRAME FOR FLOOR APPLICATIONS

Frame Type 5
- 1 in. Flange

Removable core is furnished with frame. When spring clip is furnished, add an additional 1/4 in. to duct width.



FACE VIEW OF FRAME

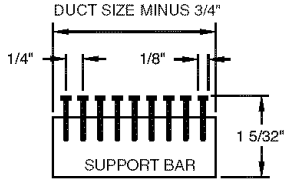


AVAILABLE CORES

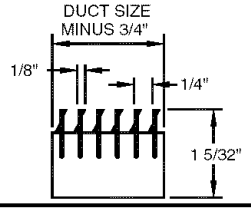
☐ Check Selection

1/4 in. Spacing
1/8 in. Bars

☐ **MODEL CT-480**
0° DEFLECTION

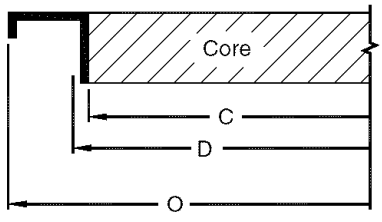


☐ **MODEL CT-481**
15° DEFLECTION



OVERALL LENGTH AND WIDTH

Length



	DUCT SIZE	FRAME	CORE
TYPE	D	O	C
5	16	$17^{3}/_{8}$	$15^{3}/_{8}$

Width

1/4 in. SPACING			
DUCT SIZE	FRAME	CORE	NUMBER OF BLADES
D	O	C	
8	$9^{3}/_{8}$	$7^{3}/_{8}$	29

Fig. 55 — 35BF-CT Rectangular Floor Grille

OPERATION

Initial Start-Up Procedures — The 45UC underfloor fan terminal units and 42KC perimeter fan coil units are designed to provide varying quantities of cold primary air to a space in response to a thermostat demand for cooling. For a heating demand, the fan will operate to supply ceiling plenum air to the space or for units equipped with a heating coil, the heater will operate as required to meet a heating demand.

The 45XC fan-powered mixing box is designed to provide airflow to an underfloor plenum at a specified pressure set point. The air supplied to the plenum is a mixture of primary air and ceiling plenum air. The fan speed is adjusted automatically by the control to provide the required airflow to maintain desired plenum temperature set point while the primary air damper will modulate to maintain the desired plenum pressure. In response to a cooling demand from a thermostat, the damper will increase the amount of cold primary air while the fan reduces the amount of ceiling plenum air to decrease the temperature of the air being delivered to the space. Typical plenum design temperatures are approximately 62 to 63 F, but the 45XC zone controller will automatically adjust the temperature to meet the load conditions and maintain the balance point.

The 45UC underfloor fan terminal control packages provide pressure independent operation of the primary air damper, regardless of changes to the available static pressure in the primary supply. To balance the unit, it is necessary to set both the minimum and maximum airflow set points of this controller. The many types of control options available each have specific procedures required for balancing. Refer to the submittal information for these requirements.

NOTE: The following steps MUST be followed in order to properly operate and service this unit.

1. Disconnect all electrical power to the unit.

⚠ WARNING

Failure to disconnect the power to the fan box prior to checking and/or servicing the fan box could result in serious personal injury.

2. Verify that the fan box is installed level and that adequate mounting support has been provided.
3. Remove motor access panel from the bottom of the fan box, and also remove the control panel cover.
4. Test the fan motor setscrew. The setscrew should fit tightly, but it may have loosened during shipment or installation.
5. Rotate the blower by hand to ensure proper clearance between the blower and the blower housing.
6. Check the fan box for loose fiberglass insulation, especially on the electric heater elements or the hot water coils (if these accessories are installed).
7. Check the control enclosure and remove any debris.
8. Check the induction inlet filter (if provided) for obstructions, and verify the filter is securely in place.
9. Verify the main power supply to the connection to the fan box for proper voltage.
10. Identify the control system supplied.
11. Check all control connections (and/or electric) for proper installation.
12. Connect electrical power.

45XC Start-Up and Checkout Procedure

⚠ CAUTION

Before proceeding with start-up, be certain that voltage, frequency, and phase correspond to unit specifications. Unless noted, all fan motors are 60 Hz, 115, 208/240, or 277 vac electric heat. The electric heat voltage may exceed the blower motor voltage requirement. Excessive voltage to the fan box may seriously damage it. Verify that the DDC (if equipped) is receiving 24 vac, –15%, +20%.

⚠ CAUTION

All underfloor terminal units are shipped with cardboard packaging rings placed in one side of the blower housing internal to the blower/motor. These rings are provided to prevent damage to the motor during shipment. The rings MUST BE REMOVED prior to operation. The packing rings are accessible through the terminal's plenum. Turn the fan wheel by hand to ensure that blower is free spinning. Carrier will not accept responsibility for any additional costs for removal of this packaging material. Failure to remove cardboard rings could result in damage to the unit.

Before balancing the system, the air handlers must be operating in accordance with the specifications for air capacity, static pressure, and temperature. The following items MUST be checked:

1. All fans must be running at calculated and specified rpm.
2. Permanent or temporary filters must be clean and installed where required.
3. All central station dampers must be adjusted and operating properly.
4. All thermostats must be calibrated and at the desired settings.
5. All ductwork must be tight.
6. All dirt or loose lining must be removed from inside ductwork.
7. Pumps and sprays, when used, must be in operation.
8. Connections to the coil, when used, must be checked.
9. Water control valve, if used, must be checked.

42KC Start-Up — Use the Carrier Comfort Network® communication software to start up and configure the fan coil controller. All set-up and set point configurations are factory-set and field-adjustable.

Changes can be made using the ComfortWORKS® software, ComfortVIEW™ software, or Network Service Tool. The Network Service Tool is a portable interface device that allows the user to change system set-up and set points from a zone sensor or terminal control module. During start-up, the Carrier software can also be used to verify communication with each fan coil controller.

For specific operating instructions, refer to the literature provided with the software.

PERFORM SYSTEM CHECK-OUT

1. Check correctness and tightness of all power and communication connections.
2. At the fan coil, check fan and system controls for proper operation.
3. At the fan coil, check electrical system and connections of any optional electric reheat coil. If hot water reheat is used, check piping and valves against job drawings.

4. Ensure that area around the fan coil is clear of construction dirt and debris.
5. Check that final filters are installed in the fan coil. Dust and debris can adversely affect system operation.
6. Verify that the fan coil controller controls are properly connected to the CCN bus.

INITIAL OPERATION AND TEST — Perform the following procedure:

1. Apply power to the unit.
2. Connect the service tool to the phone jack service port of the controller.
3. Using the service tool, upload the controller from address 0,1. The address may be set at this time. Make sure that Service Tool is connected to this fan coil unit only when changing the address.

CONFIGURATION

45XC Commissioning — The Commissioning function permits the user to calibrate the damper position and zero-calibrate the pressure sensor. Commissioning is performed using points on the maintenance display (see Table 7).

Table 7 — Commissioning Function

FUNCTION	CODE	DESCRIPTION
INPUT	CMODE	Commissioning Mode
	CALIBRAT	Damper/Transducer Cal
	MAXCOOL	Maximum Cooling Pressure
	MINCOOL	Minimum Cooling Pressure
	HEATOVER	Maximum Heating Pressure
	COMCFM	Pressure Set Point
	MVP	Actual Plenum Pressure
	SAT	Supply Air Temperature
OUTPUT	MODE	Terminal Mode
	CAL	Auto Calibration
	OFFSET	Pressure Transducer Calibration Offset (internal point)

PROCESS (ALGORITHM) — If the Calibration mode is set to Enable, the controller will interrupt its normal control to provide a means for an air balancer to easily test and commission the equipment. Once in the Commissioning mode, the control will remain in that mode until all tests are completed or for a maximum of 1 hour. During commissioning, the POINTS display screen MODE will indicate "COMMISS."

If the Commissioning mode and the Damper/Transducer are both set to Enable, the controller will first test and calibrate the damper to verify the position feedback potentiometer is functioning and internally set the actuator full stroke time. A zero calibration will also be performed on the pressure transducer. If either test fails, the CAL (Auto Calibration) output will be set to alarm. When the test is completed successfully, the control will reset the Damper/Transducer Calibrate input to Disable.

The control will then provide a method to set, verify and test the cooling maximum and cooling minimum pressure limits. While in the Commissioning mode, if the Maximum Cooling input is set to Enable, the controller will recover the configured maximum cooling pressure limit as configured, and display the value as the pressure set point. If incorrect, the balancer can enter the correct value in the pressure set point, and this value will then be transferred back to the maximum cooling configuration limit. The control will then modulate the damper to achieve this set point and will display the resulting pressure as the actual pressure. If the pressure is incorrect, the balancer can enter the correct value as the actual pressure and the control will store this value. Once completed, or if the Minimum Cooling input is set to Enable, the Maximum Cooling input is reset to Disable. If the Minimum Cooling input is set to Enable, the process is repeated except the minimum cooling pressure limit is used. If a correction is necessary, the control calculates an offset when the balancer enters the correct value.

If the heat override input is set to Enable, the pressure is modulated to the greater of the reheat airflow limit or the minimum cooling limit, and full heating is provided. Heating can be verified by the balancer through the Supply Air Temperature displayed value. Heating will be controlled during the test to avoid exceeding the maximum duct temperature. The 45XC configuration data is displayed in Tables 8-21.

ABNORMAL CONDITIONS AND RESPONSES — If the controller is unable to calibrate the open/close potentiometer readings or zero calibrate the pressure transducer during the commissioning function of damper/transducer calibration, an alarm indication will be set using the CAL point. A CCN alarm message will also be generated. The alarm condition is cleared when calibration is successfully accomplished.

45XC Set-Up and Configuration

1. With the primary airflow disabled (AHU OFF), select the Air Balancing Maintenance screen (ZNAIRBAL) and set the Commissioning Mode to ENABLE.
2. Set the Damper/Transducer Cal to ENABLE. Allow the primary air damper to fully close. After the controller calibrates the 0% open primary air damper position, the controller will fully open the damper and calibrate the 100% open primary air damper position. The primary air damper will fully close to the 0% position and the controller will zero calibrate the pressure transducer. When the test is complete, the Damper/Transducer Cal point will automatically revert back to DISABLE. Once this occurs, verify that the Auto-Calibration point at the bottom of the screen reads 'NORMAL.' If so, the terminal has been calibrated successfully. Force the Commissioning Mode point to DISABLE, then AUTO, which will remove the 45XC terminal controller from the commissioning mode.
3. Select the Set Point table (SETPOINT) and configure the desired Occ Heat set point, which should be set to the desired space temperature value. If the system (primary air source) is shut down at night during unoccupied times and an accelerated morning cool down is desired, configure the Occ Cool set point between 3 and 4° F above the Occ Heat set point. If this cycle is not desired, set the Occ Cool set point to 99.
4. In the Set Point table, configure the Unocc Heat set point and Unocc Cool set point to the same values as the occupied values unless a second space temperature set point is desired.

   NOTE: Setting the unoccupied space heating set point lower than normal (below 70 F) consumes additional energy to maintain this lower temperature set point. The underfloor system is NOT designed for unoccupied operation at the terminals, but rather at the primary air source (AHU or RTU) or through a field-installed zone damper to disable primary airflow from the source to the 45XC mixing terminal. If a lower unoccupied heating set point is required, configure the Unocc Heat set point to that lower value. The 45XC mixing terminal should be set to occupied operation at all times to ensure maximum system efficiency. Again, if an accelerated cool down transition is desired, configure the Unocc Cool set point to a value approximately 4° F above the Unocc Heat set point. When an accelerated cool down transition is not used, the Unocc Cool set point is configured to 99.
5. In the Service Config Table (PRESS), configure the Cool Minimum Plenum Pressure set point, which is used for normal control.

6. If the Occ or Unocc Cool set points are used, configure the Cool Maximum Plenum Pressure set point; otherwise, set this value equal to the Cool Minimum value. The Cool Maximum value is the controlling plenum pressure set point used when the space temperature equals or exceeds the Cool set point. When the space temperature is between the heating and cooling set points, the plenum pressure is controlled to a linear interpolation between the two pressure set points.
7. In the Service Config table (PRESS), configure the Heat Minimum Plenum Pressure set point. This is the plenum pressure set point used whenever the central station equipment is in a heating mode, such as Morning Warm Up (as detected by the primary air temperature sensor). This value should be set lower than the Cool Minimum Plenum Pressure set point in order to reduce airflow to this zone when the space temperature has achieved the heating set point. This will prevent overheating of the space.

   NOTE: Only primary air, NOT return air, is used when the primary air source is operating in the heating mode. The terminal fan will only operate at minimum speed. The primary air damper will modulate as required to maintain the desired heating plenum pressure set point.
8. Configure the Heat Maximum Plenum Pressure set point. The controlling plenum pressure set point is used during morning warm up, when the space temperature falls below the heating set point and the primary air source is providing heated air. The value is usually set equal to the Cool Minimum Plenum Pressure set point in order to warm the space for occupancy and achieve the heating set point quickly.

Table 8 — 45XC Controller Identification Table

TABLE NAME	CONTROLLER ID
Device Name	CID_UF
Description	Underfloor Controller
Location	—
Software Part Number	CESR131317-01
Model Number	—
Serial Number	WWYYnnnnnn
Reference Number	Version 1.0

LEGEND

CID_UF — Controller Identification — Underfloor
— — Blank Field

Table 9 — 45XC Points Display Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	ACCESS
MODE	Terminal Mode	MODE	(1)	R
TYPE	Terminal Type	UNDERFLR	(2)	R
CNTSP	Controlling Set Point	XXX.X F	–40.0-245.0	R
SPT	Space Temperature	XXX.X F	–40.0-245.0	R/W
MVP	Plenum Pressure	X.XXX wg	0.000-2.000	R/W
DMPPOS	Damper Position	XXX% OPEN	0-100	R
SAT	Plenum Air Temperature	XXX.X F	–40.0-245.0	R/W
RH	Relative Humidity	XXX.X%	0.0-100.0	R/W
AQ	Air Quality (ppm)	XXXX	0-5000	R/W
PATEMP	Primary Temperature	XXX F	–40-245 (3)	R/W
REMTCIN	Unocc Override	Off	Off/On	R/W

LEGEND

R — Read
R/W — Read/Write
UNDERFLR — Underfloor

NOTES:
1. Modes = OFF [0], HEAT [1], COOL [5], VENT [3], FAN & VENT [4], DEHUMID [6], WARM-UP [2], REHEAT [7], PRESSURE [8], EVAC [9], ZEROCAL [10], COMMISS [11]
2. UNDERFLR is equivalent to CID PAR_FAN Type and is fixed for this application.
3. Used by Linkage Master Zone for Mode determination, if configured as a system and no air source is specified, otherwise spare temperature sensor.

Table 10 — 45XC Pressure Set Point Service Configuration Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
COOLMIN	Cool Minimum	X.XX wg	0.00-2.00	0.06
COOLMAX	Cool Maximum	X.XX wg	0.00-2.00	0.08
HEATMIN	Heat Minimum	X.XX wg	0.00-2.00	0.04
DB_PCT	Deadband	XX.X%	7.5-20.0	12.5
HEATMAX	Heat Maximum	X.XX wg	0.00-2.00	0.08

Table 11 — 45XC Terminal Service Configuration Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
DAMPER PID				
Kp	Proportional Gain	XXX.X	–100.0-100.0	30.0
Ki	Integral Gain	XXX.X	–5.0-5.0	2.5
Kd	Derivative Gain	XXX.X	–20.0-20.0	0.0
STARTVAL	Start Value	XXXX.X%	0.0-100.0	10.0
DMPDIR	CW Rotation	Close/Open	0-1	0 (Close)
HEATING PID				
Kp	Proportional Gain	XXX.X	–100.0-100.0	4.0
Ki	Integral Gain	XXX.X	–5.0-5.0	0.5
Kd	Derivative Gain	XXX.X	–20.0-20.0	0.0
STARTVAL	Start Value	XXXX.X F	40.0-125.0	65.0
MAXTEMP	Maximum Temperature	XXX F	40-200	90
SPTTRIM	SPT Trim	XXXX.X ^F	–9.9-9.9	0.0
SATTRIM	SAT Trim	XXXX.X ^F	–9.9-9.9	0.0
RMTCFG	Unocc. Override Configuration (Close)	Open/Close	0-1	1

LEGEND

SAT — Space Air Temperature
SPT — Space Temperature
UNOCC — Unoccupied

Table 12 — 45XC Option Service Configuration Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
SCH	Occupancy Schedule #	XXX	64-99	64
GSM	Global Schedule Master	No/Yes	0-1	0 (No)
OVR	Override (Hours: Minutes)	XX:XX	00:00-24:00	00:00
SETT	Set Point Group #	XXX	0-16	0
GSTM	Global Set Point Master	No/Yes	0-1	0 (No)
LIMT	Maximum Offset Adjust	XX.X ^F	0-15.0	2.0
BROACK	Broadcast Acknowledger	No/Yes	0-1	0 (No)
SENSOPT	Sensor Options*	XXX	0-2	0

*0 = None, 1 = Humidity, 2 = IAQ.

Table 13 — 45XC Alarm Configuration Table (Type 10H)

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
ROUTING	Alarm Routing Control	XXXXXXXX	0-1 each pos	00000000
RETIME	Re-alarm Time	XXXX min	0-1440	0 (disabled)
SPTHYS	SPT Occupied Hysteresis	XX.X ^F	1.0-100.0	5.0
UNOCCUPIED SPT				
LOWLIM	High Limit	XXX.X F	–40.0-245.0	40.0
HIGHLIM	Low Limit	XXX.X F	–40.0-245.0	99.0
HIGHVP	High Plenum Pressure	X.XXX wg	0.000-2.000	0.200
OCCUPIED RH				
LOWLIM	High Limit	XXX.X%	0.0-100.0	0.0
HIGHLIM	Low Limit	XXX.X%	0.0-100.0	100.0
UNOCCUPIED RH				
LOWLIM	High Limit	XXX.X%	0.0-100.0	0.0
HIGHLIM	Low Limit	XXX.X%	0.0-100.0	100.0
AIR QUALITY				
LOWLIM	High Limit	XXXX.X	0.0-5000.0	250.0
HIGHLIM	Low Limit	XXXX.X	0.0-5000.0	1200.0

Table 14 — 45XC Linkage Configuration Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
ZONE LINKAGE				
MZENA	Linkage Master Zone	No/Yes	0-1	0 (No)
NSYSTZ	Number of Zones	XXX	1-239	1
ASBUSB	Air Source Bus Number	XXX	0-239	0
ASELEMN	Air Source Element Number	XXX	0-239	0
STATIC PRESSURE RESET				
MINDP	Reset Min Damper Position	XX%	0-99	50
MAXDP	Reset Max Damper Position	XXX%	0-100	85
SPMAX	Maximum Reset	X.X wg	0.0-5.0	0.0
SPRVAR	SP Reset Variable Name	XXXXXXXX*	A-Z, 0-9, blank, -, _	—
CCN-LINKAGE DATA				
CCNVAR	CCN-Variable Name	XXXXXXXX*	A-Z, 0-9, blank, -, _	—
CCNFUNC	CCN Function Config†	X	0-3	3
DATA RATE	Data Transfer Rate	XX min	1-15	10
CCNOUTP	CCN Output Point	XXXXXXXX*	A-Z, 0-9, blank, -, _	—
DESTBUSN	Destination Bus Number	XXX	0-239	0
DESTELEN	Destination Element Number	XXX	0-239	0
BRD_RECV	Sensor Mode 1 = Local Sensor 2 = Broadcast 3 = Listen!	X	1-3	1
SENSCFG	Listen Sensor Config 1 = SPT 2 = SPT & Offset	X	1-2	1
BRDDEVID	Broadcasting Element Number	XXX	1-239	1

*ASCII text.
†0 = None
1 = Average
2 = Low
3 = High

Table 15 — 45XC Set Point Table

DESCRIPTION	POINT	STATUS/UNITS	RANGE	DEFAULT
Occ Heat Set Point	OHSP	XXX.X F	40.0-90.0	72.0
	OCSP	XXX.X F	45.0-99.9	74.0
	UHSP	XXX.X F	40.0-90.0	72.0
	UCSP	XXX.X F	45.0-99.9	90.0

LEGEND

OCC — Occupied
OCSP — Occupied Cool Set Point
OHSP — Occupied High Set Point
UCSP — Unoccupied Cool Set Point
UHSP — Unoccupied High Set Point

Table 16 — 45XC Zone Linkage Maintenance Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	ACCESS
ASBUSNUM	Air Source Bus Number	XXX	—	R
ASDEVADR	Air Source Element Number	XXX	—	R
MZDEVADR	Master Zone Element Number	XXX	—	R
ASOPMODE	Operating Mode	*	—	R
ASTEMP	Air Source Supply Temp	XXX.X F	—	R
STRTBIAS	Start Bias Time	XXX min	—	R
AOHS	Average Occ Heat Set Point	XXX.X F	—	R
AOCS	Average Occ Cool Set Point	XXX.X F	—	R
AUHS	Average Unocc Heat Set Point	XXX.X F	—	R
AUCS	Average Unocc Cool Set Point	XXX.X F	—	R
AZT	Average Zone Temp	XXX.X F	—	R
AOZT	Average Occ Zone Temp	XXX.X F	—	R
CCCNVAL	Composite CCN Value	XXX.X F†	—	R
OCCSTAT	Occupancy Status**	X	—	R
NEXTOCCD	Next Occupied Day	XXX	—	R
NEXTOCCT	Next Occupied Time	XX:XX	—	R
NEXTUNOD	Next Unoccupied Day	XXX	—	R
NEXTUNOT	Next Unoccupied Time	XX:XX	—	R
PREVUNOD	Previous Unoccupied Day	XXX	—	R
PREVUNOT	Previous Unoccupied Time	XX:XX	—	R
MAXDMPOS	Maximum Damper Position	XXXXX.X%	0.0-100.0	R/W
PRESVAL	Static Press Reset	X.X wg	0.0-5.0	R/W
PRESDECR	Pressure Decrease Value	X.XXX wg	0.000-5.000	R/W
PRESINCR	Pressure Increase Value	X.XXX wg	0.000-5.000	R/W

LEGEND

R — Read
R/W — Read/Write

*Modes = OFF [1], COOLING [4], HEATING [3], FREECOOL [5], PRESSURE [6], EVAC [7].

†No units for this as this is varying in nature and depends on the CCN output point name in config table.
**1=Occupied.

Table 17 — 45XC Zone Maintenance Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	ACCESS
ZONE_OCC	Occupied	No/Yes		R
DAVCTL	Linkage Slave	No/Yes		R
LINKMAST	Linkage Master	No/Yes		R
TIMOV	Timed Override in Effect	No/Yes		R
T56OFF	Set Point Offset (T-56)	XXX.X ^F	–20.0-20.0	R/W
CCMR	Cool Master Reference	XXX.X F	45.0-99.9	R/W
PPREF	Plenum Pressure Reference	X.XXX wg	0-2.000	R/W
HEATENA	Fan Enable	Ena/Disa		R
HCMR	Fan Master Reference	XXX.X F	40.0-90.0	R/W
HSMR	Plenum Temperature Reference	XXX F	0-200	R/W
TCA	Temperature Control Airflow	XXX%		R
COOLFLAG	Cooling in Effect	No/Yes		R
HEATFLAG	Heating in Effect	No/Yes		R

LEGEND

R — Read
R/W — Read/Write

Table 18 — 45XC Air Balancing Maintenance Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	ACCESS
CMODE	Commissioning Mode	DIS/ENA	0-1	R/W
CALIBRAT	Damper/Transducer Cal	DIS/ENA	0-1	R/W
MAXCOOL	Max Cooling Pressure	DIS/ENA	0-1	R/W
MINCOOL	Min Cooling Pressure	DIS/ENA	0-1	R/W
HEATOVER	Max Heating Pressure	DIS/ENA	0-1	R/W
CONCFM	Pressure Set Point	X.XX wg	0-2.00	R/W
MVP	Actual Plenum Pressure	X.XXX wg	0.000-2.000	R/W
SAT	Supply Air Temperature	XXX.X F	–40.0-245.0	R/W
CAL	Auto Calibration	NORMAL/ALARM	0-1	R

LEGEND

DIS/ENA — Disable/Enable
R — Read
R/W — Read/Write

Table 19 — 45XC Holiday Configuration Tables

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT VALUE
MONTH	Start Month	XX	1-12	1
DAY	Start Day	XX	1-31	1
DURATION	Duration	XXX	0-365	0

Table 20 — 45XC Time Schedule Configuration Table

POINT	DESCRIPTION	STATUS/UNITS	RANGE	DEFAULT
OVR	Manual Override Hours	X hours	0-4	0
DOW1	Period 1: Day of Week	XXXXXXXX	0/1	1's
OCC1	Period 1: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC1	Period 1: Occupied to	XX:XX	0:00-24:00	24:00
DOW2	Period 2: Day of Week	XXXXXXXX	0/1	0's
OCC2	Period 2: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC2	Period 2: Occupied to	XX:XX	0:00-24:00	24:00
DOW3	Period 3: Day of Week	XXXXXXXX	0/1	0's
OCC3	Period 3: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC3	Period 3: Occupied to	XX:XX	0:00-24:00	24:00
DOW4	Period 4: Day of Week	XXXXXXXX	0/1	0's
OCC4	Period 4: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC4	Period 4: Occupied to	XX:XX	0:00-24:00	24:00
DOW5	Period 5: Day of Week	XXXXXXXX	0/1	0's
OCC5	Period 5: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC5	Period 5: Occupied to	XX:XX	0:00-24:00	24:00
DOW6	Period 6: Day of Week	XXXXXXXX	0/1	0's
OCC6	Period 6: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC6	Period 6: Occupied to	XX:XX	0:00-24:00	24:00
DOW7	Period 7: Day of Week	XXXXXXXX	0/1	0's
OCC7	Period 7: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC7	Period 7: Occupied to	XX:XX	0:00-24:00	24:00
DOW8	Period 8: Day of Week	XXXXXXXX	0/1	0's
OCC8	Period 8: Occupied from	XX:XX	0:00-24:00	0:00
UNOCC8	Period 8: Occupied to	XX:XX	0:00-24:00	24:00

LEGEND

DOW# — Period #: Day of Week
OCC# — Period #: Occupied from
UNOCC# — Period #: Occupied to

Table 21 — 45XC Time Schedule Maintenance

POINT	DESCRIPTION	STATUS/UNITS	RANGE	ACCESS
TIME SCHEDULE				
MODE	Mode	X	0-1	R
PERIOD	Current Occupied Period	X		R
OVERLAST	Override in Progress	No/Yes	0-4	R
OVERDURA	Override Duration	X Hours	0-4	R
OCCSTART	Occupied Start Time	XX:XX	0:00-24:00	R
UNSTART	Unoccupied Start Time	XX:XX	0:00-24:00	R
NXTOCCD	Next Occupied Day	X	SUN-SAT, blank	R
NXTOCCT	Next Occupied Time	XX:XX	0:00-24:00	R
NXTUNOD	Next Unoccupied Day	X	SUN-SAT, blank	R
NXTUNOT	Next Unoccupied Time	XX:XX	0:00-24:00	R
PRVUNOD	Last Unoccupied Day	X	SUN-SAT, blank	R
PRVUNOT	Last Unoccupied Time	XX:XX	0:00-24:00	R

LEGEND

R — Read

42KC Set-Up and Configuration

FAN, HEAT, AND COOL CONFIGURATION AND TEST — Reference Tables 22-28 to configure and test the fan, cool, and heat processes:

1. Display the Fan Coil Service Configuration screen to make sure the Cool Type, Heat Type, fan speeds, and other options are configured.
2. Display the Points Display table. In most cases, the fan will start up in low speed due to the default settings. If the fan does not come on, forcing the fan output to ON using the Points Display table will cause the fan to run at low speed. Check to ensure the fan is running.
3. Refer to 42KC Fan Coil Airflow Adjustment and set both SCR1 and SCR2 to deliver the desired airflow. With the fan running at low speed, bring up the Fan Coil Maintenance screen. Two points are available to change fan speed to Medium or High. Change the speeds by forcing the point. Make sure the fan runs at the correct speeds. Change the points back to AUTO after completing the test.
4. Heating operation can be tested with the fan running in the occupied mode by forcing the space temperature point. Force the point to a value 5° F above the cooling set point to test the fan speed control and 2° F below the heating set point to test heating.

42KC Fan Coil Airflow Adjustment

1. Using a CCN service interface tool, start the fan by placing the controller in the occupied mode. Adjust the occupied set points so that the current space temperature is at least 5° F above the heating set point and at least 5° F below the cooling set point (the satisfied Space Temperature condition).
2. As noted on the Points Display table, verify that Fan Mode is displaying "LOW." Set SCR1 to adjust the lowest airflow, which will be provided under conditions where the space temperature is satisfied.
3. From the Maintenance screen, force the Fan Speed Medium point (FANSPD1) to ON. The fan will operate at medium speed. Adjust SCR2 to provide the required airflow on medium speed.
4. From the Maintenance screen, force the Fan Speed High point (FANSPD2) to ON. The fan will operate at high speed. There is no adjustment for high speed fan operation. The fan and motor will operate at full speed.
5. If high speed fan operation is not desired, then change the number of fan speeds (FAN_TYPE in the Service Configuration table) to 2. If electric heat is supplied, verify that the airflow provided at the medium speed setting of SCR 2 in step 2 above is sufficient to provide adequate airflow through the electric heater.

For additional information on the 42KC controller (P/N 33ZCFANCOL) and a full description of each value, default and range information, refer to the fan coil controller installation, start-up and configuration instructions.

Setting Fan Airflow with ECM (Electronically Commutated Motor) — The 45XC series fan-powered mixing boxes are equipped with ECMs and DO NOT require balancing. Fan speed is automatically adjusted to meet the temperature and pressure set points for the underfloor plenum. The ECM is programmed to provide a maximum airflow, depending on model and unit size. See Table 29 for airflow range.

Balancing Underfloor Fan Terminals — Carrier 45UC underfloor fan terminal units contain primary air dampers which, under the control of a volume controller, regulate the amount of primary air or plenum air (dependent on installation) distributed to the space.

The 45UC underfloor terminals direct all return plenum air through the unit fan. The terminal is designed to operate with the fan supplying airflow equal to or greater than the airflow supplied by the primary air source. To balance the unit, it is necessary to first set the fan flow, then the VAV damper (primary) flow.

Each control option has specific procedures required for balancing the unit, but some steps are common to all terminal units. The fan box adjustments described below must be made in conjunction with the adjustments described in the Speed Controller and Set Points sections. The VAV damper airflow may be set at the factory, but the fan airflow must be set in the field as described below. See Table 30.

Table 22 — 42KC Points Display Table

POINT	DESCRIPTION	DEFAULT	UNITS
MODE	Desired Mode	Fan Only	
ALARM	Equipment Status	Alarm	
CSPT	Controlling Set Point	70.0	dF
SPT	Controlling Temperature	72.0	dF
RAT	Space Temperature	72.0	dF
SAT	Supply Air Temperature	68.2	dF
FANSTAT	Fan Mode	Low	
CCAP	Cooling Capacity	0.0	%
HCAP	Heating Capacity	0.0	%
FLTSTAT	Filter Status	Clean	
CHGMODE	Changeover Mode	Heat	
CON_PUMP	Condensate Pump	Off	
REMOTE	Remote Start	Off	
SFS	Supply Fan Status	On	
AQ	Air Quality (PPM)	0.0	
RH	Relative Humidity	0.0	%RH
OAT	Outdoor Air Temperature	0.0	dF
CCV1	Valve/DX1	Off	
CCV2	Valve/DX2	Off	
HCV1	Heating 1	Off	
HCV2	Heating 2	Off	
DAMPER	Damper Output	Close	
FAN	Fan Output	On	

Table 23 — 42KC Unit with Modulating Hot Water Heat Service Configuration Table

NAME	DESCRIPTION	DEFAULT	UNITS
UNITTYPE	2-Pipe Changeover	Disable	
FAN CONTROL			
FANOPR	Fan Operation*	1	
FAN_TYPE	Number of Fan Speeds (1-3)	3	
FAN PID			
KP	Proportional Gain	50.0	
KI	Integral Gain	0.0	
KD	Derivative	0.0	
STARTVAL	Starting Value	100.0	%
COOL_TYP	Cooling Type†	0	
COOLING PID			
KP	Proportional Gain	8.0	
KI	Integral Gain	0.3	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	65.0	dF
STAGED COOLING			
STAGES	Number of Stages	1	
TG1	Stage 1 Time Gard	Enable	
TG2	Stage 2 Time Gard	Disable	
CLT1	2-Pos Valve Logic Type	Normal	
CLT2	Stage 2 DX Logic Type	Normal	
HEAT_TYP	Heating Type**	1	
HEATING PID			
KP	Proportional Gain	13.0	
KI	Integral Gain	1.3	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	80.0	dF
HCROV	Fan Off Value	55.0	dF
STAGED HEATING			
STAGES	Number of Stages	2	
HLT1	2-Pos Valve Logic Type	Normal	
DMP	2-Position Damper	No	
AIR QUALITY			
AQINLO	AQ Low Voltage	0.0	Volts
AQINHI	AQ High Voltage	10.0	Volts
AQLO	AQ Low Reference (PPM)	0.0	
AQHI	AQ High Reference (PPM)	2000.0	
FIL_TIMR	Filter Timer hrs * 100	15	
CPTIMR	Condensate Pump Timer	10	min
RATTRIM	Space Temp Trim	0.0	^F
SATTRIM	Supply Air Temp Trim	0.0	^F

* 0=Auto, 1=Continuous.
†1=Mod, 2=2-Pos, 3=DX.
**1=Mod, 2=2 Pos, 3=Elec 4=2-Pipe Chg w/Elec Ht.

Table 24 — 42KC with 2 Position Hydronic Heat or 1-Stage Electric Heat Service Configuration Table

NAME	DESCRIPTION	DEFAULT	UNITS
UNITTYPE	2-Pipe Changeover	Disable	
FAN CONTROL			
FANOPR	Fan Operation*	1	
FAN_TYPE	# Fan Speeds (1-3)	3	
FAN PID			
KP	Proportional Gain	40.0	
KI	Integral Gain	0.0	
KD	Derivative	0.0	
STARTVAL	Starting Value	100.0	%
COOL_TYP	Cooling Type†	0	
COOLING PID			
KP	Proportional Gain	8.0	
KI	Integral Gain	0.3	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	65.0	dF
STAGED COOLING			
STAGES	Number of Stages	1	
TG1	Stage 1 Time Gard	Enable	
TG2	Stage 2 Time Gard	Disable	
CLT1	2-Pos Valve Logic Type	Normal	
CLT2	Stage 2 DX Logic Type	Normal	
HEAT_TYP	Heating Type	**	
HEATING PID			
KP	Proportional Gain	35.0	
KI	Integral Gain	0.0	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	105.0	dF
HCROV	Fan Off Value	55.0	dF
STAGED HEATING			
STAGES	Number of Stages	1	
HLT1	2-Pos Valve Logic Type	Normal	
DMP	2-Position Damper	No	
AIR QUALITY			
AQINLO	AQ Low Voltage	0.0	Volts
AQINHI	AQ High Voltage	10.0	Volts
AQLO	AQ Low Reference (PPM)	0.0	
AQHI	AQ High Reference (PPM)	2000.0	
FIL_TIMR	Filter Timer hrs * 100	15	
CPTIMR	Condensate Pump Timer	10	min
RATTRIM	Space Temp Trim	0.0	^F
SATTRIM	Supply Air Temp Trim	0.0	^F

*0=Auto, 1=Continuous.
†1=Mod, 2=2-Pos, 3=DX.
**Enter Type 2 for two-position hot water/steam.
Enter Type 3 for 1 stage electric heat.

Table 25 — 42KC with 2-Stage Electric Heat Service Configuration Table

NAME	DESCRIPTION	DEFAULT	UNITS
UNITTYPE	2-Pipe Changeover	Disable	
FAN CONTROL			
FANOPR	Fan Operation*	1	
FAN_TYPE	# Fan Speeds (1-3)	3	
FAN PID			
KP	Proportional Gain	40.0	
KI	Integral Gain	0.0	
KD	Derivative	0.0	
STARTVAL	Starting Value	100.0	%
COOL_TYP	Cooling Type†	0	
COOLING PID			
KP	Proportional Gain	8.0	
KI	Integral Gain	0.3	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	65.0	dF
STAGED COOLING			
STAGES	Number of Stages	1	
TG1	Stage 1 Time Gard	Enable	
TG2	Stage 2 Time Gard	Disable	
CLT1	2-Pos Valve Logic Type	Normal	
CLT2	Stage 2 DX Logic Type	Normal	
HEAT_TYP	Heating Type**	1	
HEATING PID			
KP	Proportional Gain	15.6	
KI	Integral Gain	1.6	
KD	Derivative Gain	0.0	
STARTVAL	Starting Value	93.0	dF
HCROV	Fan Off Value	55.0	dF
STAGED HEATING			
STAGES	Number of Stages	2	
HLT1	2-Pos Valve Logic Type	Normal	
DMP	2-Position Damper	No	
AIR QUALITY			
AQINLO	AQ Low Voltage	0.0	Volts
AQINHI	AQ High Voltage	10.0	Volts
AQLO	AQ Low Reference (PPM)	0.0	
AQHI	AQ High Reference (PPM)	2000.0	
FIL_TIMR	Filter Timer hrs * 100	15	
CPTIMR	Condensate Pump Timer	10	min
RATTRIM	Space Temp Trim	0.0	^F
SATTRIM	Supply Air Temp Trim	0.0	^F

*0=Auto, 1=Continuous.
†1=Mod, 2=2-Pos, 3=DX.
**1=Mod, 2=2 Pos, 3=Elec 4=2-Pipe Chg w/Elec Ht.

Table 26 — 42KC Set Point Table

NAME	DESCRIPTION	VALUE	UNITS
SETPOINTS			
OHSP	Occupied Low Setpoint	70.0	dF
OCSP	Occupied High Setpoint	74.0	dF
UHSP	Unoccupied Low Setpoint	55.0	dF
UCSP	Unoccupied High Setpoint	90.0	dF
ORHH	Occupied High Humidity	100.0	%RH
URHH	Unoc High Humidity	100.0	%RH

Table 27 — 42KC Fan Coil Maintenance Table

NAME	DESCRIPTION	VALUE	UNITS
OCCSTAT	Occupied	Yes	
DAVCL	Linkage in Effect	No	
TIMOV	Timed Override in Effect	No	
STRTBIAS	Start Bias Time	0	min
T56OFF	Setpoint Offset (T-56)	0.0	F
T57STAT	T57 Status	4	
HCMR	Heat Master Reference	70.0	dF
HCSR	Heat Submaster Reference	150.0	dF
CCMR	Cool Master Reference	74.0	dF
CCSR	Cool Submaster Reference	150.0	dF
COOLFLAG	Cooling in Effect	No	
HEATFLAG	Heating in Effect	No	
REHTFLAG	Reheat in Effect	No	
FANPCT	Fan Speed	0	%
FANSPD1	Fan Speed Medium	Off	
FANSPD2	Fan Speed High	Off	
CHGTEMP	Changeover Temperature	95.3	dF
CHANGOVR	Changeover Status	Heat	
LINKAGE THERMOSTAT			
LINKSTAT	Linkage Status	2	
SUPE-ADR	Supervisory Element	0	
SUPE-BUS	Supervisory Bus	0	
BLOCKNUM	Supervisory Block	0	
OCLOSTPT	Average Occ Heat Setpt	0.0	dF
OCHISTPT	Average Occ Cool Setpt	0.0	dF
UNLOSTPT	Average Unoc Heat Setpt	0.0	dF
UNHISTPT	Average Unoc Cool Setpt	0.0	dF
AZT	Average Zone Temp	0.0	dF
AOZT	Average Occ Zone Temp	0.0	dF
OCCSTAT	Occupancy Status (1=occ)	1	

Table 28 — 42KC Fan Coil Alarm Configuration Table

NAME	DESCRIPTION	VALUE	UNITS
ALARM CONTROL			
ALRMCNT	Alarm Routing Control	11010000	
REALARM	Realarm Time	0	min
SPTHYS	Control Temp Hysteresis	5.0	^F
SUPPLY AIR TEMPERATURE			
LOWLIM	Low Limit	45.0	dF
HIGHLIM	High Limit	150.0	dF
OCCUPIED RH			
LOWLIM	Low Limit	30.0	%RH
HIGHLIM	High Limit	70.0	%RH
UNOCCUPIED RH			
LOWLIM	Low Limit	10.0	%RH
HIGHLIM	High Limit	90.0	%RH
AIR QUALITY			
LOWLIM	Low Limit	0.0	
HIGHLIM	High Limit	1200.0	

Table 29 — 45XC Fan-Powered Zone Mixing Unit (ECM)

UNIT SIZE	INLET SIZE	MOTOR HP	ECM MOTOR AMPS			PRIMARY AIRFLOW		ECM FAN AIRFLOW**		MAX FLOW
			120 V FLA*	240 V FLA*	277 V FLA	Max	Min†	Max	Min	
4	6	1/2	9.5	4.7	4.1	521	52	1200	250	1721
	8					927	93			2127
	10					1448	145			2648
	12					2085	208			3285
7	10	1	18.0	9.0	8.1	1448	145	2500	400	3948
	12					2085	208			4585
	14					2838	284			5338
	16					3706	371			6206

LEGEND

ECM — Electronically Commutated Motor
FLA — Full Load Amps

*Special order.
†This value is based on a signal of 0.03 in. wg differential pressure of the linear averaging flow probe. Minimum Primary flow may be zero.

**Rpm/torque controlled motor, at 0.1 in. wg static pressure underfloor.

NOTE: Data is based on tests conducted in accordance with ARI (Air Conditioning and Refrigeration Institute) Standard 880-98.

Table 30 — 45UC Underfloor Series Flow Fan Box (ECM)

UNIT SIZE	INLET SIZE	MOTOR HP	MOTOR AMPS			FAN AIRFLOW*		PRIMARY AIRFLOW†		MINIMUM STATIC PRESSURE (in. wg)
			120 V	208/240 V	277 V	Max	Min	Max	Min**	
3	9	1/3	4.1	—	2.4	1000	280	900	203	0.10
4	9	1/3	3.9	—	2.3	1050	360	900	203	0.10
	10	1/3	3.9	—	2.3	1050	360	1050	251	0.09

LEGEND

ECM — Electronically Commutated Motor

*Max based on 0.1 in. wg downstream static pressure.
Min based on 0.6 in. wg downstream static pressure.

†Maximum primary airflows are set by the maximum induced airflow, which may vary as a function of downstream pressure.
**Some DDC controls supplied by others may have different limitations.

Speed Controller — Each 45UC fan-powered air terminal unit is equipped with a fan SCR speed controller located on the bottom of the control box. The SCR can be adjusted in the field. (One SCR is located in the standard position at the bottom of the control box; the other is at the top of the control box.)

⚠ CAUTION

The minimum stop on the speed controller is factory set at an internal minimum stop to prevent damage to the motor. Do not attempt to override this minimum stop or electrical damage to the fan motor may result.

The fan airflow output is dependent on the setting of the controller and the downstream static resistance.

To increase the fan speed, turn the slotted adjustment on the controller clockwise toward the "HI" marking printed on the controller faceplate (see Fig. 56). To decrease the fan speed, turn the slotted adjustment on the controller clockwise toward the "LO" marking (see Fig. 56).

Set Points

ADJUSTMENT OF SET POINTS — Each 45UC underfloor terminal unit, supplied with CCN controls, is equipped with an electronic volume controller which regulates the quantity of cold primary air entering the terminal and the conditioned space. If required airflow levels are specified with the job order, the minimum and maximum cfm levels will be set at the factory (where applicable). If minimum and maximum levels are not specified, a default value of 0 is used for minimum setting at the factory. Other settings of minimum and maximum primary airflow must be set in the field. Airflow (cfm) ranges for the primary air damper and fans are shown in Table 30. The minimum primary airflow (other than zero) is the minimum flow rate controllable by the unit volume controller. The primary air damper can be set at zero for shutoff or at the minimum cfm listed.

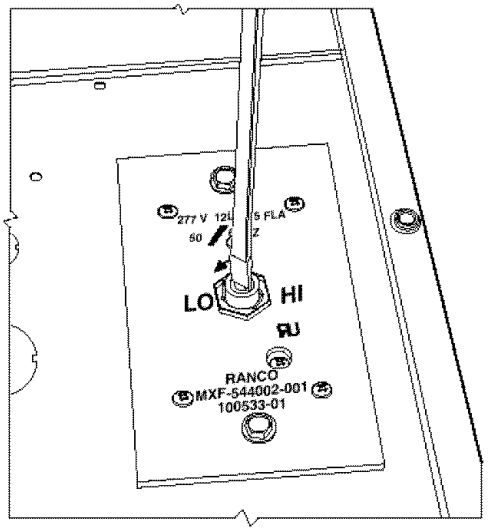


Fig. 56 — 45UC Fan Speed Controller

FIELD ADJUSTMENT OF MINIMUM AND MAXIMUM AIRFLOW SET POINTS — Each 45UC underfloor terminal unit is equipped with a centerpoint averaging airflow sensor, which provides an amplified differential pressure that is proportional to the unit airflow. Output from this sensor is used to provide a flow signal to both pneumatic and electronic controls. Unit airflow (cfm) can be read directly from the airflow sensor labels on the unit. See Fig. 57 and Table 30.

1. With the unit airflow from the fan set, turn on primary (VAV) air supply.
2. To set cfm in the field, connect a gage to the flow probe at the provided 'T' taps, and check the differential pressure.

   (Alternately, the total flow may be measured, and the previously determined fan induction flow rate may be subtracted from the total flow to determine VAV flow. However, for low primary settings, this may not be as accurate as the flow tap method.)
3. If a minimum VAV flow is required in heating mode, adjust the volume until the differential pressure corresponds to the cfm required.
4. Set the controller to provide maximum cooling demand. This is typically accomplished by first setting the thermostat to the lowest possible temperature setting.
   a. In most series fan boxes, the primary airflow rate is equal to the fan induction flow; in these cases, adjust the volume controller until a balance is achieved between fan-induced airflow and primary airflow. When a balance exists, a strip of paper hung at the induction port should hang straight down, and neither be blown in or out of the unit.
   b. If the VAV airflow desired is less than the fan induction flow, adjust the volume controller until the differential pressure (measured through the flow probe as described above) corresponds to the cfm required. Verify that induction exists through the inlet ports, using the paper strips as described above. When induction exists, the paper strip should be pulled into the unit.
5. Return all reheat options to normal connections.
6. Cap the 'T' taps.
7. Reset the thermostat to a normal setting.

NOTE: It is normal for the total airflow to the room to increase slightly in full cooling mode.

Testing and Start-Up

1. Place the 45XC controller in the Occupied mode. This action may be completed through the occupancy schedule or via the Occupancy Input point on the Point Display table.
2. Verify the required information was entered as specified in the 45XC Set-Up and Configuration section. Verify the primary air source is operating in a Cooling mode. Adjust the occupied heating set point to approximately 1° F above the current zone temperature and adjust the occupied cooling set point to the maximum value (99 F). From the Points Display Table, verify the Terminal Mode (MODE) is HEAT.
3. Allow the system to operate and determine the controlling pressure set point. The controlling plenum pressure reference (PPREF) can be found in the ZNMAIN table. Note the pressure reference value. Monitor the fan enable point (HEATENA) and verify that the status changes to ENA and the 'Heating in effect' flag is YES. Once this occurs, proceed to the plenum temperature reference point (HSMR) and FORCE this value to the design temperature that the system was selected for (approximately 62 F). Proceed to the Points Display Table (POINTS) and verify that the Actual Plenum Pressure (MVP) is at or near the noted reference and the plenum temperature is at the desired value that was previously entered (forced). If these values do not comply, the primary air damper (DMPPOS) should modulate to achieve this pressure set point while the fan speed will change to achieve the desired plenum temperature.

   NOTE: If the damper position is at 100% and the Actual Plenum Pressure is still below the desired pressure set point, either the terminal has insufficient capacity to achieve the desired pressure set point, excessive leakage is occurring from the plenum, or the fan is not operating properly.

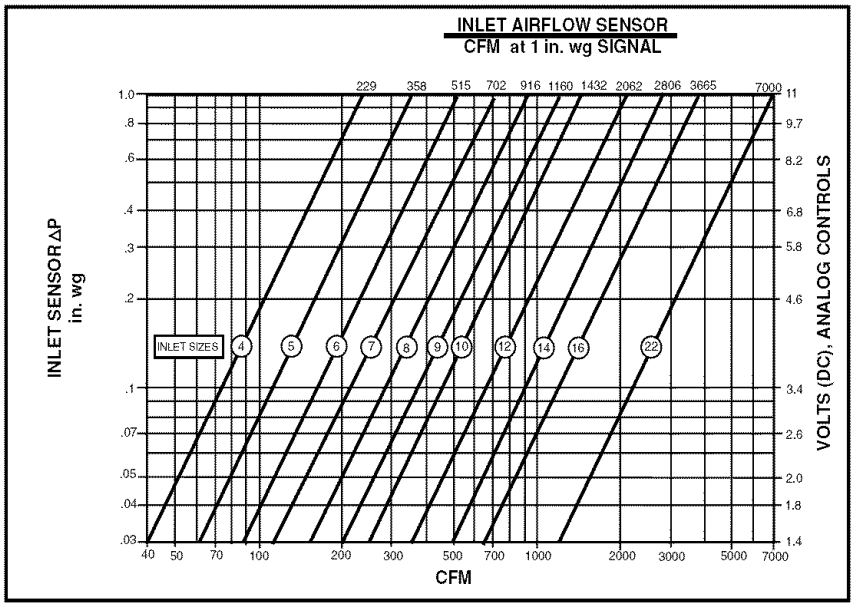


Fig. 57 — Inlet Airflow Sensor Cfm vs Signal Chart

4. Verify that the fan can maintain the desired plenum pressure at minimum load conditions. Force the plenum temperature reference point (HSMR) to the maximum design temperature that the system was selected for (approximately 65 to 67 F). Verify return air to the terminal is at least at this temperature or greater. Allow sufficient time for the fan speed to increase. Verify that the primary air damper closes, then connect a Magnehelic gage to the terminal's primary airflow pickup probes. Using Fig. 57 (provided with the terminal), manually adjust the primary air damper position to achieve the desired minimum primary airflow for ventilation. From the Points Display Table (POINTS), read the actual damper position (DMPPOS) and configure the minimum primary air damper position (MIN_VENT) in Table 9.

   NOTE: If the Actual Plenum Pressure is below the desired pressure set point, either the terminal has insufficient fan capacity to achieve the desired pressure set point, excessive leakage is occurring from the plenum, or the fan is not operating properly.
5. While the Magnehelic gage is still connected, manually open the primary air damper in order to achieve the maximum rated box primary airflow. Set the primary air damper actuator's mechanical stop so that the damper cannot exceed this position.
6. When completed, remove all forces previously applied for testing purposes.

45XC Operation — As the space temperature varies around the space temperature set point, the fan speed is controlled to regulate the amount of return air allowed into the plenum, which in turn, the return air (hot) quantity is varied. The primary damper then adjusts to reduce the supply air (cold) in order to maintain a constant pressure in the duct. Underfloor plenum pressure is maintained at set point, which supplies air to the space through diffusers. The space air will heat up and hot air will reach the ceiling plenum. Several factors contribute to the heating of the space air: the occupancy, lighting loads, perimeter heating, mechanical heating by independent underfloor controller, etc. It is the job of the fan to introduce the proper proportion of ceiling plenum air to the supply air to maintain the space temperature at the configured heating set point.

These variable speed, parallel fan-powered terminals are designed to provide constant flow pressure and temperature control for a sealed underfloor plenum. These terminals are primarily used for plenums serving a single interior zone, where a combination of primary air mixed with recirculated air provides proper plenum pressure, temperature and ventilation. They may also be used in conjunction with a separate perimeter heating system to condition exterior zones. A typical application is shown in Fig. 1. Design load requirements and terminal fan capacity govern terminal selection and sizing. The control can provide variable air volume (VAV) control of the primary air during both cooling and heating. The fan provides plenum temperature control by varying the amount of recirculated air introduced into the plenum, while the primary air damper simultaneously maintains the plenum pressure by controlling the amount of primary air introduced into the plenum. As the zone's cooling load decreases, the fan speed increases, which increases the amount of recirculated air drawn in from the ceiling plenum. Simultaneously, the amount of primary air is reduced to maintain a constant discharge pressure. A wall-mounted space temperature (SPT) sensor located in the zone will sense load requirements. The terminal fan will operate whenever the primary air source is operating.

FOR 45XC UNITS WITH CONTROL PACKAGE 4840

System Start-Up — Cooling (Refer to Numbers in Fig. 58)

1. Points 1 and 2 indicate that maximum cooling airflow is established by the user-defined maximum cooling plenum pressure set point until the zone comes under control at 2 (this may be the same value as the minimum cooling pressure set point). The fan operates at minimum speed.
2. Beginning at 2, the plenum pressure is reduced by reducing the primary airflow until the minimum cooling plenum pressure set point is reached at 3.

Normal Operation — Cooling (Refer to Numbers in Fig. 58)

1. Point 3 indicates that the zone temperature is above the control (heating) set point, the plenum pressure is maintained at the user-defined minimum cooling plenum pressure set point.
2. At point 4, as the zone temperature decreases, the plenum temperature is increased by increasing the fan speed to introduce more recirculated air while simultaneously reducing the primary airflow. The plenum pressure remains constant at the user-defined minimum cooling plenum pressure set point.
3. As indicated by points 4 and 5, should the zone temperature continue to fall below the occupied control set point, the primary air damper will close but not below the user-defined minimum ventilation set point at point 5 (may be set to zero), while the fan provides recirculated air to maintain the plenum pressure set point.

Heating (When the Primary Air Source is Providing Heated Air, Refer to Numbers in Fig. 59)

1. Upon receiving a heating signal generated by the air source equipped with CCN controls (or a primary air temperature sensor is installed to detect that the air source is heating), the heating mode is automatically in effect.
2. If the zone temperature is above the occupied heating set point, the primary air damper is modulated to maintain the minimum heating plenum pressure set point at 4 ft-lb. The fan operates at minimum speed.
3. Should the zone temperature fall, the plenum pressure will increase up to the user-defined maximum heating plenum pressure set point at 5 ft-lb. The control may be configured to provide constant volume heating to provide a constant supply of heated air to the zone.

Morning Warm-Up (If Configured to Provide Variable Volume Heating, Refer to Numbers in Fig. 59) — Upon receiving a morning warm-up signal generated by the air source equipped with CCN controls, the primary air damper will modulate to maintain the maximum heating plenum pressure set point if the zone temperature is below the occupied heating set point at 5 ft-lb. This allows a maximum quantity of warm primary air to be delivered to the zone. As the zone's temperature rises, the plenum pressure is reduced to the minimum heating plenum pressure 4 ft-lb. The terminal fan operates at minimum speed.

Cooling — Unoccupied Time Period (Optional) — When the unoccupied period is reached, the user-defined occupied cooling set point can be reset upward to a user-defined unoccupied cooling set point. If the primary air source is operating, the primary air damper will throttle in the same manner (see System Start-Up — Cooling and Normal Operation — Cooling) during the unoccupied period, using the zone's unoccupied cooling set point.

Heating — Unoccupied Time Period (Optional) — When the unoccupied period is reached, the user-defined occupied heating set point can be reset downward to a user-defined unoccupied heating set point. If the primary air source is operating, the primary air damper will operate in the same manner (see Heating) during the unoccupied period, using the zone's unoccupied heating set point.

Demand Controlled Ventilation Sensor (Optional) — The control provides an input for a ventilation sensor (CO_2) that can be used to monitor the ventilation provided to the zone. The sensor value can also be used by a CCN system in order to modulate the mixed-air damper on the primary air source equipment and provide demand controlled ventilation.

Damper Override — The damper override function is energized through the use of a field-supplied smoke control panel connected to the air source equipped with CCN controls. The smoke control panel and installation must be in accordance with UL864 and local codes. The damper override function overrides the airflow setting used by the logic. It will cause the terminal to provide the configured maximum cooling plenum pressure when the air source is in the Pressurization mode, and fully close the primary air damper when the air source is in the evacuation mode. The terminal fan is disabled only after the primary air is off.

If the Primary Air Source Shuts Off — The primary air damper will fully close and the control will recalibrate the plenum pressure transducer. If the primary air source remains off (no primary air), the damper will be repositioned to at least 50% open to allow the air source to restart properly.

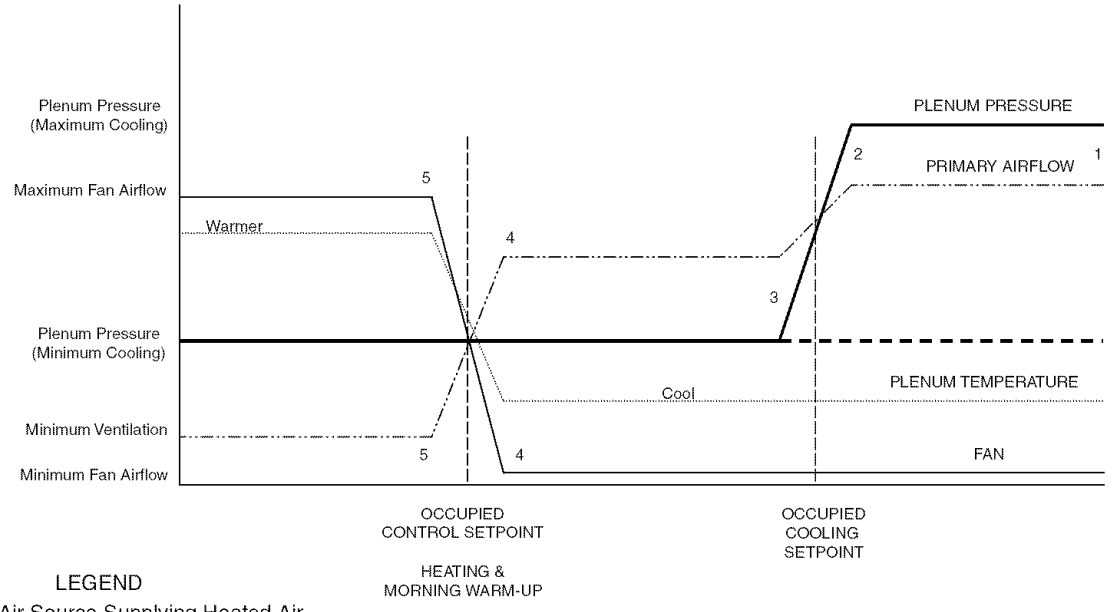


Fig. 58 — Sequence of Operation — Equipment Cooling Mode (Control Package 4840)

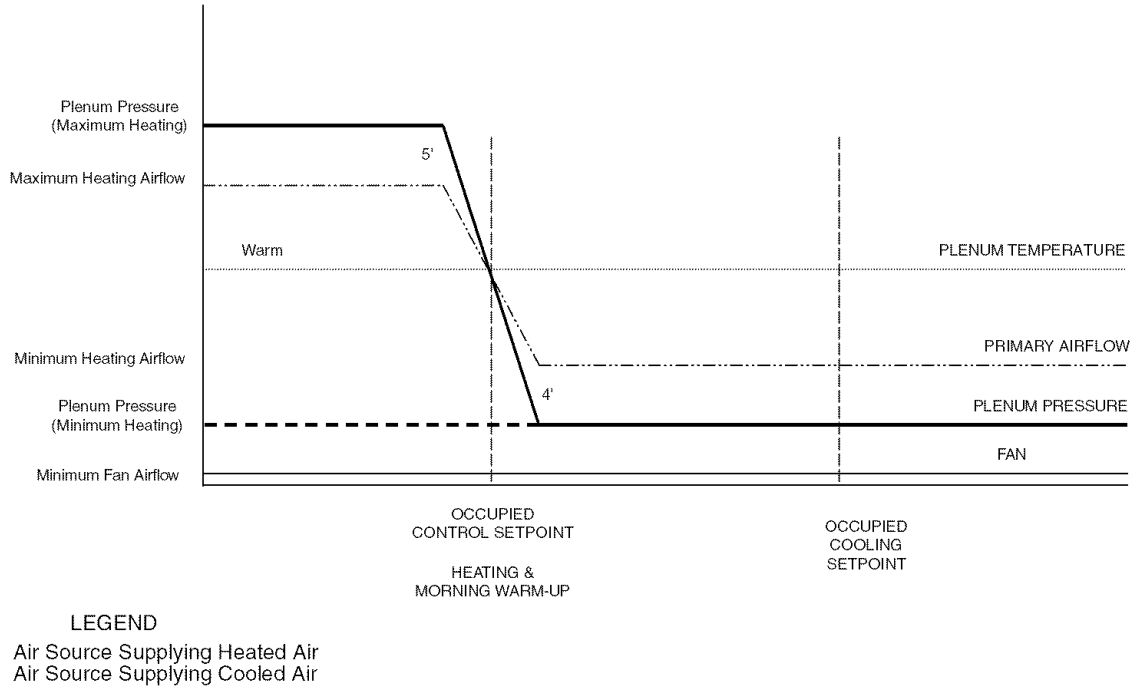


Fig. 59 — Sequence of Operation — Equipment Heating Mode (Control Package 4840)

FOR 45XC UNITS WITH CONTROL PACKAGE 4841

System Start-Up — Cooling (Refer to Numbers in Fig. 60) — Points 1-4 indicate that maximum cooling airflow is provided by primary air until the zone comes under control at 4. The fan operates at minimum speed.

Normal Operation — Cooling (Refer to Numbers in Fig. 60)

1. Points 1-3 indicate that if the zone temperature is above the control (heating) set point (typically 70 F), the terminal's 55 F primary airflow from the air source is maximized to provide cold air to the plenum and cool the space. The fan is at minimum airflow and the total volume of air is maintained at the required constant airflow set point.
2. At point 4, as the zone temperature drops closer to the occupied heating set point, the discharge air temperature from the terminal into the plenum is increased by increasing the fan speed to introduce more recirculated air while simultaneously the primary airflow is reduced to maintain the total airflow into the access plenum. As indicated by points 4 and 5, should the zone temperature continue to fall, the primary air damper will close but not below the user defined minimum ventilation set point at 5 (may be set to zero), while the fan provides recirculated air from the return plenum, to maintain constant airflow into the underfloor plenum.

Heating (When the Primary Air Source [AHU] is Providing Heated Air, Fig. 61) — Upon receiving a heating signal generated by the air source equipped with CCN controls (or a primary air temperature sensor is installed to detect that the air source is heating), the heating mode is automatically in effect and the primary air damper is modulated to maintain constant airflow into the plenum. The fan operates at minimum speed.

Unoccupied Time Period (Optional) — When an unoccupied period is reached, the user-defined occupied control set point (heating set point) can be reset upward to a user defined unoccupied set point to minimize the use of primary air during unoccupied periods. If the primary air source is operating, the primary air damper will close and the fan will maintain the desired airflow into the plenum. The control operates in the same manner (see Normal Operation — Cooling) during the unoccupied period, using the zone's higher unoccupied control set point.

NOTE: In common plenum applications, unoccupied control is not recommended unless all terminals use the exact same time schedule and set points):

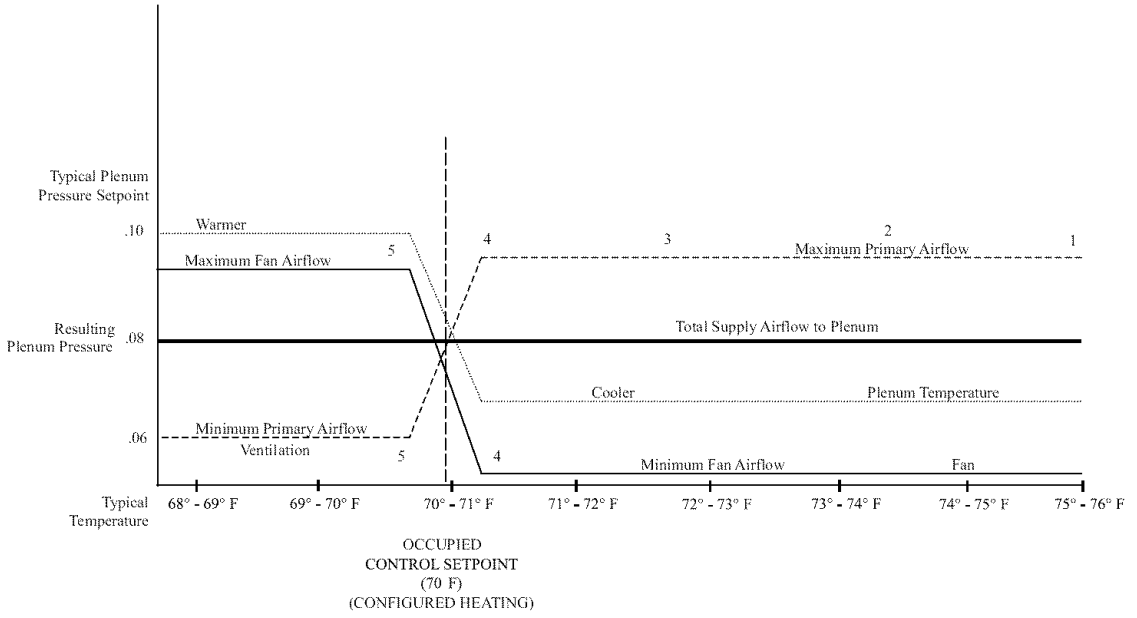
Demand Controlled Ventilation Sensor (Optional) — The control provides an input for a ventilation sensor (CO_2) that can be used to monitor the ventilation provided to the zone. The sensor value can also be used by a CCN system in order to modulate the mixed air damper on the primary air source equipment and provide demand controlled ventilation.

Damper Override — The damper override function is energized through the use of a field-supplied smoke control panel connected to the air source equipped with CCN controls. The smoke control panel and installation must be in accordance with UL864 and local codes. The damper override function overrides the primary airflow setting used by the logic. It will cause the terminal to provide the configured maximum airflow into the plenum when the air source is in the Pressurization mode, and fully close the primary air damper when the air source is in the Evacuation mode. The terminal fan is disabled only if the primary air is off.

Primary Air Source Shuts Off

1. The primary air damper will fully close and the control will recalibrate the plenum pressure transducer.
2. If the primary air source remains off (no primary air), the damper will be repositioned to at least 50% open to allow the air source to restart properly.

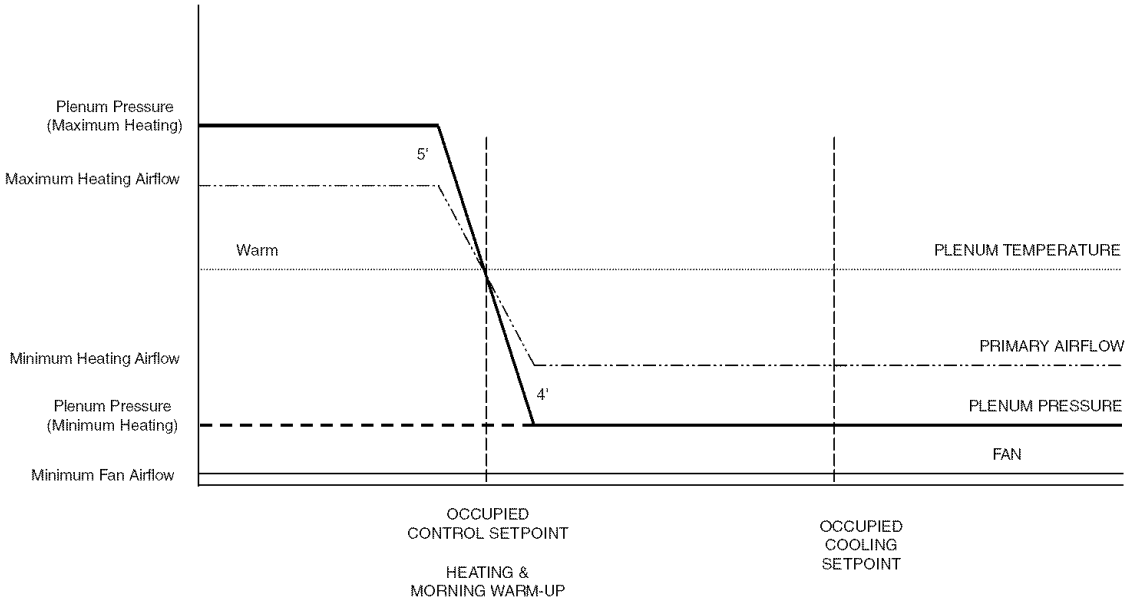
Calibration of Airflow Sensors — In a common plenum application with multiple terminals, all primary air sources supplying primary air to terminals feeding the common plenum must operate on the exact same schedule and must transition to "Off" at the same time at least once each day for 25 minutes to allow all airflow (pressure) transducers to recalibrate properly. Considering the amount of time required for recalibration, it is suggested that the recalibration period take place during the unoccupied period, if one exists. Sequentially, each primary air damper will fully close and each control will recalibrate its pressure transducer.



LEGEND

- - - - Air Source Supplying Heated Air
——— Air Source Supplying Cooled Air

Fig. 60 — Sequence of Operation — Equipment Cooling Mode (Control Package 4841)



LEGEND

- - - - Air Source Supplying Heated Air
——— Air Source Supplying Cooled Air

Fig. 61 — Sequence of Operation — Equipment Heating Mode (Control Package 4841)

42KC Fan Coil Sequence

CONTROL MODES — The control operating mode is determined based upon the fan coil's mechanical configuration (heating coil type) and optional features, such as the T57 space temperature sensor's fan speed switch selection. The fan will NOT operate and the mode will remain OFF if the T57's fan speed selection is in the OFF position. Otherwise, the control will determine the operating mode as defined below.

Morning Start — Warm-up — If the space temperature is below the Occupied Heating Set Point, the unit will operated in the "Occupied Heating Mode" as described below.

Morning Start — Cooling — If the space temperature is above the Occupied Cooling Set Point, the unit will operated in the "Occupied Cooling Mode" as described below.

Occupied Heating Mode — Water/Steam — If the space temperature falls below the heating set point, the water valve will modulate (open for two position control valves) as required to maintain the heating set point. The valve is controlled to prevent the discharge air temperature from rising above 140 F at any time. During heating, if the fan has not been manually set (T57 only) to operate at a desired fixed speed, the fan will operate at the lowest speed necessary to meet the space load conditions in order to minimize fan noise. If the load increases, the fan speed will increase. When the load decreases and the space temperature rises, the fan speed is reduced. If the space temperature rises above the heating set point, the heating valve is closed.

Occupied Heating Mode — Electric Heat — If the space temperature falls below the heating set point, the electric heater stages are controlled to maintain the space temperature at the desired heating set point. During heating, if the fan speed has not been manually selected (T57 only) to operate at a desired speed, the fan will operate at the lowest speed necessary to meet the space load conditions, to minimize fan noise. If the supply air temperature should rise above 130 F while electric heat is operating, the fan speed is automatically increased (except if manually overridden from a T57 sensor). The fan will maintain high speed until all stages of electric heat have been disabled or the supply air temperature drops below 100 F. If the supply air temperature continues to increase above 140 F, the heater stages are deenergized. To protect against short cycling, the first heater stage is prevented from being restarted for a 5-minute period after being deenergized. If the space temperature rises above the heating set point, all heating stages are disabled.

Unoccupied Heating Mode — The fan will be energized and the heat will be activated when the space temperature falls 1° F below the unoccupied heating set point. The heat is controlled in order to prevent the supply air temperature from rising above 140 F at any time. The fan will operate at low speed unless the low speed is unable to raise the space temperature to the unoccupied heating set point. The fan will be deenergized and the heat disabled when the space temperature rises above the unoccupied heating set point.

Occupied Cooling Mode — If the space temperature rises above the cooling set point and the fan has not been manually set (T57 only) to operate at a desired speed, the fan will operated at the lowest speed necessary to meet the space load conditions in order to minimize fan and air noise. As the space load increases, the fan speed will increase to deliver more air from the underfloor plenum to the diffusers to balance the load as required. When the load decreases and the space temperature falls, the fan speed is reduced.

Unoccupied Cooling Mode — All cooling is provided by the cooled air in the underfloor plenum. No unoccupied cooling is provided. Unoccupied cooling should be disabled by setting the unoccupied cooling set point to the maximum value of 99 F.

Unoccupied Fan Cycling — If unoccupied fan cycling has been selected, the fan will start once an hour and operate for 1 minute to circulate the air in the space in order to avoid air stagnation and provide more accurate space temperature sensing. The actual start time for each unit will be determined by its address.

45XC Application Considerations

1. The 45XC fan-powered mixing box is used to mix primary air with ceiling plenum return air and deliver that air into an underfloor plenum supply distribution system. The 45XC mixing box maintains plenum pressure and temperature in order to meet the load requirements of the space. The pressure is maintained at set point by modulating the primary air damper to increase or decrease the flow of primary air into the underfloor plenum. This causes the resulting pressure to increase as the airflow increases or decrease as the airflow decreases. To maintain the proper plenum temperature, the parallel fan is used to modulate the flow of return air from the ceiling plenum into the plenum. This return airflow is a parallel airflow path to the primary airflow so the two work together, but oppositely, in order to maintain plenum pressure. For example, as the calculated plenum temperature set point increases due to a load decrease in the space, the parallel terminal fan increases its speed in order to introduce more return air into the plenum. This causes the plenum pressure to increase, therefore, the primary air damper closes to reduce the plenum pressure to coincide with the configured plenum pressure set point.

IMPORTANT: The terminal fan must be capable of supplying enough return air to maintain the configured plenum pressure set point. If the fan is not able to supply enough return air, additional primary air will be used to maintain the plenum pressure set point, resulting in a plenum temperature that is colder than required, which will overcool the space.

   The terminal fan capacity and primary air damper size must both be accurately selected to achieve the complete range of plenum temperatures required, from the minimum plenum temperature at design space load to the maximum plenum temperature at minimum space load. The actual terminal capacity must meet or exceed the required plenum airflow over the full range of plenum temperatures. Refer to the 45X Underfloor Air Capacity Calculator program on the commercial marketing webpage (www.hvacpartners.com). To get to the calculator, select Carrier Commercial Marketing→Products→Airside Products→Air Terminals. Choose "45X" under the "Air Terminal Model" column, then "Documents and Downloads." The calculator is found in the Miscellaneous section.

   The 45X Underfloor Air Capacity Calculator uses specific input conditions for ceiling plenum temperature and primary air temperature to confirm that the airflow specified by the design engineers is available at the required underfloor plenum temperature.

2. The space temperature control set point for the 45XC underfloor system is ALWAYS the configured heating set point. This is the set point that the fan and primary air damper will maintain. During occupied periods, the occupied heating set point is used. The occupied cooling set point is only used to increase the plenum pressure and speed the space temperature recovery from an overtemperature condition caused by the space transitioning from unoccupied to occupied. The occupied cooling set point is NOT a temperature control set point, but rather the set point at which the control uses the maximum cooling pressure set point to increase airflow to the space. It should only be used if additional noise is acceptable in

order to expedite the space temperature recovery. The feature may be disabled by setting the maximum cooling plenum pressure set point to the same value as the minimum cooling pressure set point, or by setting the occupied space temperature set point to the maximum value.

3. The 45XC underfloor control is also equipped with unoccupied temperature set points. However, they do not function as typical unoccupied set point controls. The underfloor control always maintains the heating set point, therefore when transitioning to unoccupied operation, the unoccupied heating set point is used. If this set point is lower than the current space temperature, the fan return airflow will decrease and primary airflow will increase to lower the plenum temperature and satisfy the unoccupied heating space temperature set point while maintaining the plenum pressure set point. This causes energy consumption to increase. Conversely, if the unoccupied heating set point is raised, the primary air will be reduced while the fan speed will increase in an attempt to warm the space. Therefore, if a reduction in primary airflow is desired during unoccupied periods, then the unoccupied heating set point must be increased to the desired unoccupied space temperature set point and the unoccupied cooling set point must be set to maximum.

   A more effective way to reduce energy consumption during unoccupied periods is to disable the primary airflow to the underfloor terminals via a field-supplied damper installed in the branch duct supplying the underfloor terminals or shutting down the primary air source fan. This will eliminate both the primary air consumption and will cause the underfloor terminal fan to shut down as well.

   Unless two different temperature control set points are desired, the unoccupied set point should be set to the same values as the occupied set points. Underfloor controllers should have occupancy scheduled for 24 hours a day, 7 days a week (always occupied).

4. The Carrier Control Package 4840 is an underfloor plenum pressure control package that should only be used when one or two 45XC terminal discharges into an isolated or subdivided underfloor plenum (see 45XC Fan Speed and Temperature Control — For 45XC Units With Control Package 4840). When the plenum airflow requirements exceed the capability of two 45XC terminals, the 45XC terminals must be installed with a field-supplied velocity probe as shown in the Carrier Control Package 4841 (see 45XC Fan Speed and Temperature Control — For 45XC Units With Control Package 4841). This is done when multiple terminals are used to pressurize a common plenum. In this case, generally 70 to 80% of the total plenum airflow is controlled using the 4841 control package and 20 to 30% of the terminal airflow into the plenum is controlled using the 4840 package. The 4841 control package ensures that the common plenum is supplied evenly and that the airflow capability of a single terminal is not exceeded. Plenum pressure control is maintained by the terminal(s) using the 4840 control package.

   NOTE: If the common plenum is large and more than one 4840 terminal is used, these should be located appropriately to ensure proper pressure control and to minimize interaction between the terminals.

   The 45XC underfloor plenum control systems require the primary air source to be shut down in order to recalibrate the pressure transducers. These systems operate at extremely low pressures and must be recalibrated to provide accurate pressure and flow control. It is recommended that the primary airflow be shut down every 24 hours for at least 30 minutes to allow recalibration. When 45XC underfloor terminals are fed primary air from a common primary air system that cannot be shut down, a two-position branch damper MUST be installed to ensure the air can be closed off to the underfloor terminals for recalibration. This damper should be controlled to shut off the primary air to all underfloor terminals once every 24 hours, for 30 minutes, to allow recalibration. Additionally, if multiple 45XC terminals supply a common underfloor plenum, then the primary air must be shut off to these terminals simultaneously. Failure to provide a 30-minute recalibration period will result in incorrectly calibrated pressure transducers and a plenum pressure value at or near zero, eventually leading to a failure to calibrate transducer alarm.

Maintenance

MOTOR TROUBLESHOOTING — The PSC motors are equipped with long-life sleeve bearings with non-detergent SAE (Society of Automotive Engineers) 20 oil. Do not add oil to motors.

The ECM motor has permanently lubricated ball bearings that require no maintenance.

The ECM motors are 277 v, single phase only and use a quick-connect type plug between the power source and the motor. No alternate wiring options are available.

To Check Wiring — The PSC motor is connected by quick-connect terminals to the capacitor (brown wire), the housing wire (green ground wire), and the control box (black wire and white wire). Verify that the fan motor wiring is correct as shown in Fig. 62-64.

To remove the fan motor and wheel:

1. Disconnect wiring at the quick-connect terminals located on the motor and the bell. Note connections.
2. The fan motor and wheel assembly is attached to the discharge panel with 4 hex nuts.
3. Remove the motor by removing the 3 screws that attach the torsion flex mounts to the inlet ring.
4. Remove wheel by unscrewing the hub set screws that are accessed through the open end of the wheel.

Refer to the fan motor wiring details shown on the wiring diagram attached to the unit.

⚠ WARNING

Failure to reconnect the fan properly can cause damage to the motor and/or serious personal injury.

FAN MOTOR MAINTENANCE — Unit motors are equipped with permanently lubricated bearings. Inspect fan and motor assembly accumulation of dust and dirt as required by operating environment. Clean as necessary.

If fan motor does not run:

1. Make sure that there is free rotation of blower wheel.
2. Remove fan packing.
3. Verify that there is no freight or installation damage.
4. Check for proper unit power.
5. Disconnects should be on, and check optional fusing.
6. Check for proper control signal, pie switch setting, proper air control 24 vac at fan contactor, and that the coil is energized.

If fan motor runs with excessive noise:

1. Make sure the blower, and all components have no clearance problems and are securely attached.

2. Verify the integrity of ductwork, make sure there are no leaks or loose connections rattling diffusers or balancing dampers.
3. Confirm that the maximum cfm is not too high, or that discharge static pressure is not too low.

If fan motor runs with insufficient airflow:

1. Check for ductwork restrictions, dirty air filters, and clogged water coils.
2. Re-adjust fan speed control.
3. Discharge static pressure too high.

If repair or replacement is required:

1. Motor and fan should be removed as an assembly. Disconnect all power before servicing.
2. Remove the four hex nuts from the mounting lugs holding the fan assembly to the discharge panel, and lower the assembly.

   NOTE: Do not allow assembly to hang from wiring.
3. Loosen the setscrew if removing motor from blower.

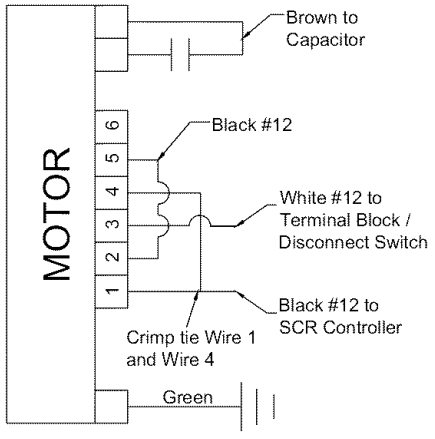


Fig. 62 — PSC Motor Wiring Terminal Block — 115 V, Single Phase

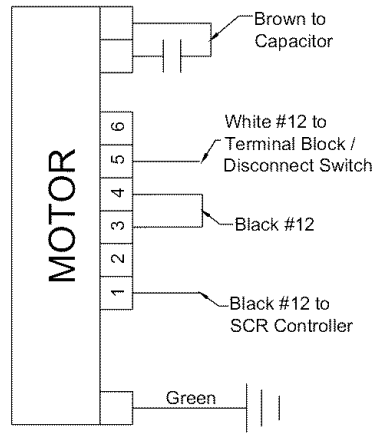


Fig. 63 — PSC Motor Wiring Terminal Block — 208/240 V, Single Phase

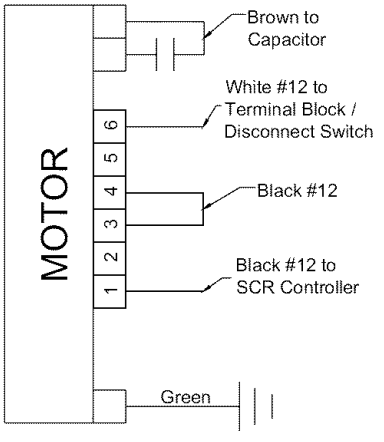


Fig. 64 — PSC Motor Wiring Terminal Block — 277 V, Single Phase

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